Consequences of eye fluke infection on anti-predator behaviours in invasive round gobies in Kalmar Sound

Larvae of the eye fluke, Diplostomum, emerge from snails and infect fish by penetrating skin or gills, then move to the lens where they may impair the vision of the fish. For the fluke to reproduce, a bird must eat the infected fish, and it has been suggested that they therefore actively manipulate the fish’s behaviour to increase the risk of predation. We found that round gobies Neogobius melanostomus, a species that was recently introduced to the Kalmar Sound of the Baltic Sea, had an eye fluke prevalence of 90–100%. We investigated how the infection related to behavioural variation in round gobies. Our results showed that the more intense the parasite-induced cataract, the weaker the host's response was to simulated avian attack. The eye flukes did not impair other potentially important anti-predator behaviours, such as shelter use, boldness and the preference for shade. Our results are in accordance with the suggestion that parasites induce changes in host behaviour that will facilitate transfer to their final host.
Dispersal potential of the round goby – how plastic are they

General information

State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Living Resources
Authors: Behrens, J. (Intern)
Publication date: 2017
Event: Abstract from CeMEB 18th Assembly, Tjärnö, Sweden.
Main Research Area: Technical/natural sciences

Early engagement of stakeholders with individual-based modelling can inform research for improving invasive species management: the round goby as a case study

Individual-based models (IBMs) incorporating realistic representations of key range-front processes such as dispersal can be used as tools to investigate the dynamics of invasive species. Managers can apply insights from these models to take effective action to prevent further spread and prioritize measures preventing establishment of invasive species. We highlight here how early-stage IBMs (constructed under constraints of time and data availability) can also play an important role in defining key research priorities for providing key information on the biology of an invasive species in order that subsequent models can provide robust insight into potential management interventions. The round goby, Neogobius melanostomus, is currently spreading through the Baltic Sea, with major negative effects being reported in the wake of its invasion. Together with stakeholders, we parameterize an IBM to investigate the goby’s potential spread pattern
throughout the Gulf of Gdansk and the Baltic Sea. Model parameters were assigned by integrating information obtained through stakeholder interaction, from scientific literature, or estimated using an inverse modeling approach when not available. IBMs can provide valuable direction to research on invasive species even when there is limited data and/or time available to parameterize/fit them to the degree to which we might aspire in an ideal world. Co-development of models with stakeholders can be used to recognize important invasion patterns, in addition to identifying and estimating unknown environmental parameters, thereby guiding the direction of future research. Well-parameterized and validated models are not required in the earlier stages of the modeling cycle where their main utility is as a tool for thought.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Living Resources, University of Aberdeen, University of Basel
Authors: Samson, E. (Eksterm), Hirsch, P. E. (Eksterm), Palmer, S. C. (Eksterm), Behrens, J. (Intern), Travis, J. M. (Eksterm)
Publication date: 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Frontiers in Ecology and the Environment
Volume: 5
Article number: 149
ISSN (Print): 1540-9295
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.85 SJR 4.779 SNIP 3.631
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 5.233 SNIP 3.238 CiteScore 3.34
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 4.607 SNIP 3.227 CiteScore 4.32
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 4.172 SNIP 2.776 CiteScore 3.67
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 4.388 SNIP 3.058 CiteScore 3.73
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 4.503 SNIP 3.395 CiteScore 3.71
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 3.466 SNIP 2.804
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 2.874 SNIP 2.656
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 2.184 SNIP 1.998
Scopus rating (2007): SJR 2.096 SNIP 2.057
Scopus rating (2006): SJR 2.78 SNIP 2.407
Scopus rating (2005): SJR 2.395 SNIP 2.095
Scopus rating (2004): SJR 1.474 SNIP 1.487
Original language: English
Electronic versions:
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Publishers version
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10.3389/fevo.2017.00149
Links:
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
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BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.85 SJR 0.843 SNIP 0.88
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.988 SNIP 1.159 CiteScore 1.91
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.913 SNIP 0.995 CiteScore 1.85
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.737 SNIP 0.807 CiteScore 1.36
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.636 SNIP 0.868 CiteScore 1.32
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.844 SNIP 0.932 CiteScore 1.29
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.847 SNIP 0.808
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.796 SNIP 0.936
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.823 SNIP 0.87
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.813 SNIP 1.255
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.863 SNIP 1.05
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.76 SNIP 0.939
Web of Science (2005): Indexed yes
Effects of high-frequency strobed laser light on Atlantic cod (Gadus morhua) physiology and behavior

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Section for Aquaculture, Centre for Ocean Life, SINTEF, Swedish University of Agricultural Sciences
Authors: Behrens, J. (Intern), Jarnit, S. (Intern), Methling, C. (Intern), Mariani, P. (Intern), Thorstensen, J. (Ekstern), Risholm, P. (Ekstern), Thielemann, J. T. (Ekstern), Haugholt, K. H. (Ekstern), Grønns, A. (Ekstern), Visser, A. (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 kirurgisk 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. (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
Publication: Research › Conference abstract for conference – Annual report year: 2017

Erfaringsopsamling med kirurgisk 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
Electronic versions:
Publishers version.pdf
Publication: Research › Conference abstract for conference – Annual report year: 2017

Evaluating dispersal potential of an invasive fish by the use of aerobic scope and osmoregulation capacity
Non-indigenous species (NIS) can impact marine biodiversity and ecosystem structure and function. Once introduced into a new region, secondary dispersal is limited by the physiology of the organism in relation to the ambient environment and by complex interactions between a suite of ecological factors such as presence of predators, competitors, and parasites. Early prediction of dispersal potential and future ‘area of impact’ is challenging, but also a great asset in taking appropriate
management actions. Aerobic scope (AS) in fish has been linked to various fitness-related parameters, and may be valuable in determining dispersal potential of aquatic invasive species in novel environments. Round goby, Neogobius melanostomus, one of the most wide-ranging invasive fish species in Europe and North America, currently thrives in brackish and fresh water, but its ability to survive in high salinity waters is unknown to date. We show that AS in round goby is reduced by 30% and blood plasma osmolality increased (indicating reduced capacity for osmoregulation) at salinities approaching oceanic conditions, following slow ramping (5 PSU per week) and subsequent long-term acclimation to salinities ranging between 0 and 30 PSU (8 days at final treatment salinities before blood plasma osmolality measurements, 12-20 additional days before respirometry). Survival was also reduced at the highest salinities yet a significant proportion (61%) of the fish survived at 30 PSU. Reduced physiological performance at the highest salinities may affect growth and competitive ability under oceanic conditions, but to what extent reduced AS and osmoregulatory capacity will slow the current 30 km year\(^{-1}\) rate of advance of the species through the steep salinity gradient from the brackish Baltic Sea and into the oceanic North Sea remains speculative. An unintended natural experiment is in progress to test whether the rate of advance slows down. At the current rate of advance the species will reach the oceanic North Sea by 2018/2019, therefore time for taking preventative action is short.

**General information**

State: Published

Organisations: National Institute of Aquatic Resources, Section for Marine Living Resources, Section for Marine Ecology and Oceanography, University of Copenhagen

Authors: Behrens, J. W. (Intern), Deurs, M. V. (Intern), Christensen, E. A. F. (Intern)

Publication date: 2017

Main Research Area: Technical/natural sciences

**Publication information**

Journal: PLoS One

Volume: 12

Issue number: 4

Article number: e0176038

ISSN (Print): 1932-6203

Ratings:

BFI (2018): BFI-level 1

Web of Science (2018): Indexed yes

BFI (2017): BFI-level 1

Web of Science (2017): Indexed yes

BFI (2016): BFI-level 1

Scopus rating (2016): CiteScore 3.11 SJR 1.201 SNIP 1.092 Web of Science (2016): Indexed yes

BFI (2015): BFI-level 1


BFI (2014): BFI-level 1

Scopus rating (2014): SJR 1.545 SNIP 1.141 CiteScore 3.54 Web of Science (2014): Indexed yes

BFI (2013): BFI-level 1

Scopus rating (2013): SJR 1.74 SNIP 1.147 CiteScore 3.94 ISI indexed (2013): ISI indexed yes Web of Science (2013): Indexed yes

BFI (2012): BFI-level 1


BFI (2011): BFI-level 1


BFI (2010): BFI-level 1


BFI (2009): BFI-level 1
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**
State: Published
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 osmorespiratory 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
PIT-tagging method for small fishes: A case study using sandeel (Ammodytes tobianus)

Passive integrated transponder (PIT) tags are commonly used to assess fish movement for use in fisheries management. Here, we investigated physiological and behavioral effects of tagging on sandeels (Ammodytes tobianus) using PIT tags constituting 2.1 ± 0.9% of their body weight. Swimming stamina (RSS), calculated as time spent swimming against the current relative to total swimming time, and tail beat frequency were compared between tagged and untagged fish as was blood hematocrit levels at 7, 14, and 42 d post-tagging. Survival and tag retention were also documented at 14, 42, and 84 d (via x-rays and dissections). RSS was not different between tagged and untagged fish with means (± SD) of 60 ± 9% and 61 ± 12%. Tail beat frequency was not different between tagged and untagged fish at 2.8 ± 0.3 and 3.0 ± 0.4 beats s⁻¹ for tagged and untagged fish, respectively. Likewise, hematocrit was not affected by tagging and levels were between 21–26% for both groups. Survival rates were high and did not differ between groups (96% for tagged and 99% untagged fish). Tag retention was 100%. X-rays and dissections did not reveal any signs of tag movement at 14–84 d, and there was no difference between relative positions of the tags. None of the tags were encapsulated in the body cavity after 14 d, whereas 40% of the tags were encapsulated in a thin tissue membrane between the intestine and kidney after 42 and 84 d, respectively. After 14 d all incisions had healed with only minor or no signs of the tag insertion site. Collectively, these data provide substantial evidence for the possibility of conducting large-scale tagging studies on this species in the field.
Sortmundet kutling - Vi spiser os til løsningen

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Living Resources
Authors: Krebs, M. L. (Ekstern), Behrens, J. (Intern)
Pages: 32-36
Publication date: 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Kaskelot
Issue number: 215
Stress and recovery from trawl capture of Norway lobster (Nephrops norvegicus) and potential for live storage

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Aquaculture, Section for Ecosystem based Marine Management, Section for Marine Living Resources, STMI
Authors: Skov, P. V. (Intern), Methling, C. (Intern), Larsen, B. K. (Intern), Unmack, C. P. (Ekstern), Karlsen, J. D. (Intern), Behrens, J. (Intern)
Publication date: 2017
Event: Abstract from Dansk Havforsknemøde, Helsingør, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2017

Tagging method for small fishes: A case study using lesser sandeel (Ammodytes tobianus)

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Section for Marine Living Resources, Den Blå Planet
Authors: Jørgensen, M. G. P. (Intern), Deurs, M. V. (Intern), Butts, I. (Intern), Jørgensen, K. (Ekstern), Behrens, J. (Intern)
Publication date: 2017
Event: Abstract from Dansk Havforsknemøde, Helsingør, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2017

Take it with a grain of salt; salinity tolerance of round goby Neogobius melanostomus

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Living Resources, University of Tartu
Authors: Behrens, J. (Intern), van Deurs, M. (Intern), Ojaveer, H. (Ekstern), Christensen, E. A. F. (Intern)
Publication date: 2017
Event: Poster session presented at CeMEB 18th Assembly, Tjärnö, Sweden.
Main Research Area: Technical/natural sciences
Publication: Research › Poster – Annual report year: 2017

The parasitic nematode Contracaecum osculatum (liver worm) in Baltic cod: Spatial differences in prevalence and intensity of infection

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Living Resources, University of Copenhagen
Authors: Sokolova, M. (Intern), Huwer, B. (Intern), Buchmann, K. (Ekstern), Behrens, J. (Intern)
Publication date: 2017
Event: Abstract from Joint spring symposium 2017, Danish Society for Parasitology and Danish Society for Tropical Medicine & International Health, Host-Parasite Communication, Copenhagen, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2017

Will salinity hinder the ongoing northward dispersal of the invasive round goby into the oceanic North Sea?

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Living Resources, Section for Marine Ecology and Oceanography
A mere fluke: can parasites help predators limit fish invasions?

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography
Authors: Flink, H. (Ekstern), Behrens, J. (Intern), Svensson, A. (Ekstern)
Publication date: 2016
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2016

Documentation on key drivers and physiological tolerance limits for resident and invasive species: Report: BIO-C3 Deliverable, D1.2

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Section for Marine Living Resources, Centre for Ocean Life, University of Tartu, University of Hamburg
Number of pages: 100
Publication date: 2016

Statusrapport vedr. udbredelsen af ikke-hjemmehørende fiskearter i danske kystvande (2016)

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, University of Copenhagen
Authors: Carl, H. (Forskerdatabase), Behrens, J. (Intern), Møller, P. R. (Forskerdatabase)
Number of pages: 35
Publication date: 2016
Publisher: Statens Naturhistoriske Museum
Digesting in hypoxia: impact on gastric evacuation rate and postprandial metabolism (SDA) of Atlantic cod, Gadus morhua

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Ministere des Peches et des Oceans
Authors: Chabot, D. (Ekstern), Behrens, J. (Intern), Andersen, N. G. (Intern)
Publication date: 2015
Event: Abstract from ICES Annual Science Conference 2015, Copenhagen, Denmark.
Main Research Area: Technical/natural sciences
Electronic versions:

Publisher's version
Links:
http://www.ices.dk/sites/pub/ASCExtendedAbstracts/Shared%20Documents/R%20- %20Causes%20and%20consequences%20of%20hypoxia/R0815.pdf (Link to full text)

Bibliographical note
ICES CM 2015/R:08
Publication: Research › Conference abstract for conference – Annual report year: 2015

Eastern Baltic cod in distress: biological changes and challenges for stock assessment
The eastern Baltic (EB) cod (Gadus morhua) stock was depleted and overexploited for decades until the mid-2000s, when fishing mortality rapidly declined and biomass started to increase, as shown by stock assessments. These positive developments were partly assigned to effective management measures, and the EB cod was considered one of the most successful stock recoveries in recent times. In contrast to this optimistic view, the analytical stock assessment failed in 2014, leaving the present stock status unclear. Deteriorated quality of some basic input data for stock assessment in combination with changes in environmental and ecological conditions has led to an unusual situation for cod in the Baltic Sea, which poses new challenges for stock assessment and management advice. A number of adverse developments such as low nutritional condition and disappearance of larger individuals indicate that the stock is in distress. In this study, we (i) summarize the knowledge of recent changes in cod biology and ecosystem conditions, (ii) describe the subsequent challenges for stock assessment, and (iii) highlight the key questions where answers are urgently needed to understand the present stock status and provide scientifically solid support for cod management in the Baltic Sea

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Marine Ecology and Oceanography, Institute Management, Section for Monitoring and Data, Swedish University of Agricultural Sciences, University of Skövde, International Council for the Exploration of the Sea, University of Kiel, Lund University, Johann Heinrich von Thünen-Institute
Pages: 2180-2186
Publication date: 2015
Main Research Area: Technical/natural sciences

Publication information
Journal: ICES Journal of Marine Science
Volume: 72
Issue number: 8
ISSN (Print): 1054-3139
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
Invasion rate and population characteristics of the invasive round goby Neogobius melanostomus: effects of density and invasion history

Round goby Neogobius melanostomus is currently one of the most wide-ranging invasive fish species in Europe and North America. The present study demonstrates how the distribution of round goby has expanded from 2008 to 2013 at a rate of about 30 km yr\(^{-1}\) along the Danish coastline in the western Baltic Sea. Further analyses showed that fish from an established high-density round goby population were slow-growing and displayed poorer condition (weight at age and hepatosomatic index) compared to fish sampled from recently invaded locations (i.e. at the forefront of the distribution range). The established population revealed a broad age distribution and a 1:1 gender ratio, while fish from a recently invaded site were primarily of intermediate ages with a male-biased gender ratio. Otolith analyses suggested that the oldest individuals from the recently invaded
area experienced superior growth conditions only in the most recent years, suggesting immigration into the area as adults. Our results suggest that intraspecific competition for food may cause continued dispersal of the species and that population demographics likely relate to invasion history.

**General information**

State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Living Resources, Section for Marine Ecology and Oceanography, University of Copenhagen
Authors: Azour, F. (Intern), Deurs, M. V. (Intern), Behrens, J. (Intern), Carl, H. (Ekstern), Hüssy, K. (Intern), Greisen, K. (Ekstern), Ebert, R. (Ekstern), Møller, P. R. (Ekstern)
Pages: 41-52
Publication date: 2015
Main Research Area: Technical/natural sciences

**Publication information**

Journal: Aquatic Biology
Volume: 24
ISSN (Print): 1864-7782
Ratings:
- BFI (2018): BFI-level 1
- Web of Science (2018): Indexed yes
- BFI (2017): BFI-level 1
- Web of Science (2017): Indexed Yes
- BFI (2016): BFI-level 1
- Scopus rating (2016): SJR 0.847 SNIP 0.895 CiteScore 1.82
- Web of Science (2016): Indexed yes
- BFI (2015): BFI-level 1
- Scopus rating (2015): SJR 0.767 SNIP 0.713 CiteScore 1.41
- Web of Science (2015): Indexed yes
- BFI (2014): BFI-level 1
- Scopus rating (2014): SJR 0.681 SNIP 0.678 CiteScore 1.44
- BFI (2013): BFI-level 1
- Scopus rating (2013): SJR 0.641 SNIP 0.618 CiteScore 1.34
- ISI indexed (2013): ISI indexed no
- Web of Science (2013): Indexed yes
- BFI (2012): BFI-level 1
- Scopus rating (2012): SJR 0.814 SNIP 0.813 CiteScore 1.7
- ISI indexed (2012): ISI indexed no
- BFI (2011): BFI-level 1
- Scopus rating (2011): SJR 0.844 SNIP 0.848 CiteScore 1.79
- ISI indexed (2011): ISI indexed no
- BFI (2010): BFI-level 1
- Scopus rating (2010): SJR 0.899 SNIP 0.666
- Web of Science (2010): Indexed yes
- BFI (2009): BFI-level 1
- Scopus rating (2009): SJR 0.631 SNIP 0.483
- BFI (2008): BFI-level 1
- Scopus rating (2008): SJR 0.461 SNIP 0.54

Original language: English
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DOI:
10.3354/ab00634
Publication: Research - peer-review › Journal article – Annual report year: 2015

Kan den invasive sortmundede kutling sprede sig til Skagerrak og Nordøen?
Oceanic boundary conditions for Jakobshavn Glacier Part I. Variability and renewal of Ilulissat Icefjord waters, 2001-2014

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Section for Marine Living Resources, New York University, Greenland Institute of Natural Resources
Authors: Gladish, C. V. (Ekstern), Holland, D. M. (Ekstern), Rosing-Asvid, A. (Ekstern), Behrens, J. (Intern), Boje, J. (Intern)
Pages: 3-32
Publication date: 2015
Main Research Area: Technical/natural sciences
Publication information
Journal: Journal of Physical Oceanography
Volume: 45
Issue number: 1
ISSN (Print): 0022-3670
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 2.76 SNIP 1.379 CiteScore 3.22
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 2.646 SNIP 1.413 CiteScore 3.01
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 2.568 SNIP 1.394 CiteScore 2.89
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 2.756 SNIP 1.554 CiteScore 3.26
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 3.216 SNIP 1.555 CiteScore 2.75
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 2.756 SNIP 1.318 CiteScore 2.54
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 2.585 SNIP 1.357
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 2.588 SNIP 1.405
BFI (2008): BFI-level 1
Parasit påvirker torskens hjerterytmer

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, University of Copenhagen
Authors: Behrens, J. (Intern), Buchmann, K. (Ekstern)
Pages: 32-35
Publication date: 2015
Main Research Area: Technical/natural sciences

Publication information
Journal: Aktuel naturvidenskab
Issue number: 1
ISSN (Print): 1399-2309
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish
Publication: Communication › Journal article – Annual report year: 2015

Review of environmental factors influencing distributions of selected Baltic species: Report: BIO-C3 Deliverable, D1.1 . EU Bonusproject BIO-C3

General information
State: Published
Organisations: National Institute of Aquatic Resources, Centre for Ocean Life, Section for Marine Ecology and Oceanography, Danish Shellfish Centre, University of Hamburg, Leibniz Institute of Marine Sciences, University of Tartu
Number of pages: 75
Publication date: 2015

Publication information
Original language: English
Main Research Area: Technical/natural sciences
Electronic versions:
Publishers version
DOIs:
10.3289/BIO-C3_D1.1
Links:
http://oceanrep.geomar.de/31919/
Salinity tolerance and correlated physiology of the invasive round goby Neogobius melanostomus

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Section for Marine Living Resources
Authors: Behrens, J. (Intern), Deurs, M. V. (Intern), Christensen, E. A. F. (Intern)
Publication date: 2015
Event: Abstract from ICES Annual Science Conference 2015, Copenhagen, Denmark.
Main Research Area: Technical/natural sciences
Electronic versions:
Publishers_version
Links:
http://www.ices.dk/sites/pub/ASCExtendedAbstracts/Shared%20Documents/Q%20-From%20genes%20to%20ecosystems.%20Spatial%20heterogeneity%20and%20temporal%20dynamics%20of%20the%20Baltic%20sea%20%20Co-sponsored%20by%20BONUS%29/Q2715.pdf (Link to full text)

Bibliographical note
ICES CM 2015/Q:27

Publication: Research › Conference abstract for conference – Annual report year: 2015

Take it with a grain of salt; salinity tolerance and correlated physiology of the invasive round goby Neogobius melanostomus

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography
Authors: Behrens, J. (Intern), Christensen, E. A. F. (Intern)
Publication date: 2015
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2015

The effect of temperature and body size on metabolic scope of activity in juvenile Atlantic cod Gadus morhua L.

Changes in ambient temperature affect the physiology and metabolism and thus the distribution of fish. In this study we used intermittent flow respirometry to determine the effect of temperature (2, 5, 10, 15 and 20 °C) and wet body mass (BM) (~30–460 g) on standard metabolic rate (SMR, mg O2 h−1), maximum metabolic rate (MMR, mg O2 h−1) and metabolic scope (MS, mg O2 h−1) of juvenile Atlantic cod. SMR increased with BM irrespectively of temperature, resulting in an average scaling exponent of 0.87 (0.82–0.92). Q10 values were 1.8–2.1 at temperatures between 5 and 15 °C but higher (2.6–4.3) between 2 and 5 °C and lower (1.6–1.4) between 15 and 20 °C in 200 and 450 g cod. MMR increased with temperature in the smallest cod (50 g) but in the larger cod MMR plateaued between 10, 15 and 20 °C. This resulted in a negative correlation between the optimal temperature for MS (Topt) and BM, Topt being respectively 14.5, 11.8 and 10.9 °C in a 50, 200 and 450 g cod. Irrespective of BM cold water temperatures resulted in a reduction (30–35%) of MS whereas the reduction of MS at warm temperatures was only evident for larger fish (200 and 450 g), caused by plateauing of MMR at 10 °C and above. Warm temperatures thus seem favourable for smaller (50 g) juvenile cod, but not for larger conspecifics (200 and 450 g)

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, University of Copenhagen
Authors: Tirsgaard, B. (Ekstern), Behrens, J. (Intern), Steffensen, J. F. (Ekstern)
Publication date: 2015
Main Research Area: Technical/natural sciences
Publication information
Journal: Comparative Biochemistry and Physiology. Part A: Molecular & Integrative Physiology
Volume: 179
ISSN (Print): 1095-6433
Twenty five years of invasion: management of the round goby Neogobius melanostomus in the Baltic Sea

The round goby, Neogobius melanostomus (Pallas, 1814), is one of the most invasive non-indigenous species in the Baltic Sea. It dominates coastal fisheries in some localities and is frequently found in offshore pelagic catches. This paper identifies management issues and suggests
actions to be considered for post-invasion management. Priority should be given to the establishment of a coordinated pan-Baltic monitoring programme and associated data storage and exchange, as well as the compilation of landing statistics of the round goby in commercial and recreational fisheries. While eradication is unrealistic, population control that leads to minimising the risk of transfer to yet uncolonised areas in the Baltic Sea and adjacent waterbodies is feasible. This should comprise the requirement that the species be landed in commercial fishery bycatch, the management of ships’ ballast water and sediments, and hull fouling of inland and sea-going vessels, including recreational boats.

Extensive involvement of stakeholders is crucial at all phases of the management process.

**Prey or predator – expanding the food web role of sandeel (Ammodytes marinus)**

We report an unexpected observation of lesser sandeel Ammodytes marinus foraging on juveniles and late larval stages of the same species. This recording sheds new light on the cannibalistic and piscivorous capacity of forage fish and raises a number of questions about the role of forage fish in marine food webs. In 2012 and 2013 the stomachs of 748 sandeels from 36 different commercial sandeel hauls in the central North Sea were opened. 9% of these stomachs contained late stage sandeel larvae. In order to better understand the cannibalistic nature of sandeels, we made a detailed analysis of another 450 sandeels from a single haul with a high frequency of apparent cannibals. One-third of the stomachs contained a minimum of one young sandeel (mean length 2.7 cm; max. length 4.9 cm), 10 percent contained 5 or more, and one stomach contained 18. Analyses of sample DNA confirmed that predator and prey were conspecifics. Larger specimens were more likely to be cannibals. However, among cannibals the specific sandeel larva consumption was independent of cannibal size. We argue that this piscivorous cannibalistic behaviour may not only be a key factor in explaining recruitment fluctuations in North Sea sandeel stocks, but it may also add a new element to the complexity of energy flow in marine food chains.

**General information**

State: Published

Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Marine Ecology and Oceanography, Israel Oceanographic and Limnological Research, Baltic Sea Advisory Council, Swedish University of Agricultural Sciences, Finnish Environment Institute, University of Tartu

Authors: Ojaveer, H. (Ekstern), Galil, B. S. (Ekstern), Lehtiniemi, M. (Ekstern), Christoffersen, M. (Intern), Clink, S. (Ekstern), Florin, A. (Ekstern), Gruszka, P. (Ekstern), Punttila, R. (Ekstern), Behrens, J. (Intern)

Pages: 329-339

Publication date: 2015

Main Research Area: Technical/natural sciences

**Publication information**

Journal: Management of Biological Invasions

Volume: 6

Issue number: 4

ISSN (Print): 1989-8649

Web of Science (2018): Indexed yes

Web of Science (2017): Indexed yes

Original language: English

Electronic versions:

DOIs: 10.3391/mbi.2015.6.4.02

Publication: Research - peer-review › Journal article – Annual report year: 2015
Seasonal migration, vertical activity and winter temperature experience of Greenland halibut Reinhardtius hippoglossoides (Walbaum) in West Greenland waters

The deep-water flatfish Greenland halibut Reinhardtius hippoglossoides (Walbaum) is common along the West Greenland coast. In the northwestern fjords, Greenland halibut is an important socio-economic resource for the Greenland community, but due to the deep and partly ice-covered environment, very little is known about its behavior and habitat characteristics. We tagged adult Greenland halibut in the waters off Ilulissat with electronic data storage tags that collected information on depth, temperature, and time. Although clear differences between individuals in migration and vertical...
behavior were present, we discovered a consistent seasonal migration from the relatively shallow-water Disko Bay area into the deep waters of the Ilulissat icefjord, where the fish resided in the winter months before returning to Disko Bay. Vertical activity was pronounced at both locations, with fish covering vertical distances of up to 100 m within 15 min. During the winter months, the fish experienced temperatures between ca. 0 and 4°C, with most experiencing temperatures of 2 to 3°C. Irrespective of year and quarter of the year, the fish experienced warmer water and a broader range of temperatures when resident in Disko Bay (mean range 2.6°C) than when resident in the ice fjord (mean range 1.4°C). Using the tagged halibut as a ‘live tool,’ we show that parts of the ice fjord are hundreds of meters deeper than previously thought. We also document the first seawater temperature measurements made beneath the Jakobshavn Isbræ outlet glacier, revealing a positive relationship between depth and temperature for the upper 600 m and a between-year variation in temperatures beneath the ice sheet in 2001, 2002, and 2003.
Temperature and oxygen as determining factors in post-stress recovery profiles of Norwegian lobster Nephrops norvegicus

The parasitic copepod Lernaeocera branchialis negatively affects cardiorespiratory function in Atlantic cod (Gadus morhua)

The parasitic copepod Lernaeocera branchialis negatively affects cardiorespiratory function in Gadus morhua such that it caused pronounced cardiac dysfunction with irregular rhythm and reduced stroke amplitude compared with uninfected fish. In addition, parasite infection depressed the postprandial cardiac output and oxygen consumption.
Can IBMs tell us why some cod undertake vertical (feeding) migrations into hypoxic waters?

**General information**

State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Section for Marine Living Resources
Authors: Behrens, J. W. (Intern), Neuenfeldt, S. (Intern), Deurs, M. V. (Intern)
Publication date: 2013
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2013

**Excess post hypoxic oxygen consumption in Atlantic cod (Gadus morhua)**

Atlantic cod Gadus morhua experienced oxygen deficit (DO2) when exposed to oxygen levels below their critical level (c. 73% of pcrit) and subsequent excess post-hypoxic oxygen consumption (CEPHO) upon return to normoxic conditions, indicative of an oxygen debt. The mean±s.e. CEPHO:DO2 was 6·9±1·5, suggesting that resorting to anaerobic energy production in severe hypoxia is energetically expensive

**General information**

State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Living Resources, Section for Marine Ecology and Oceanography, University of Copenhagen
Authors: Plambech, M. (Intern), Deurs, M. V. (Intern), Steffensen, J. (Ekstern), Tirsgaard, B. (Ekstern), Behrens, J. (Intern)
Pages: 396-403
Publication date: 2013
Main Research Area: Technical/natural sciences

**Publication information**

Journal: Journal of Fish Biology
Volume: 83
Issue number: 2
ISSN (Print): 0022-1112
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.57 SJR 0.741 SNIP 0.882
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.951 SNIP 0.935 CiteScore 1.64
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.944 SNIP 0.934 CiteScore 1.76
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.049 SNIP 1.118 CiteScore 1.98
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.93 SNIP 1.035 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 0.946 CiteScore 1.66
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
Haemoglobin genotypes in cod (Gadus morhua L): their geographic distribution and physiological significance

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Marine Ecology and Oceanography, Centre for Ocean Life, Norwegian University of Science and Technology, University of Copenhagen
Authors: Ross, S. D. (Intern), Behrens, J. W. (Intern), Brander, K. (Intern), Methling, C. (Ekstern), Mork, J. (Ekstern)
Pages: 158-168
Publication date: 2013
Main Research Area: Technical/natural sciences

Publication information
Journal: Comparative Biochemistry and Physiology. Part A: Molecular & Integrative Physiology
Volume: 166
Issue number: 1
ISSN (Print): 1095-6433
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.16 SJR 0.794 SNIP 0.879
Web of Science (2016): Indexed yes
Identification of seasonal migration, vertical activity and thermal experience of Greenland halibut Reinhardtius hippoglossoides (Walbaum) in west Greenland waters

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Section for Ecosystem based Marine Management, Section for Marine Living Resources
Authors: Behrens, J. W. (Intern), Neuenfeldt, S. (Intern), Sparrevohn, C. R. (Intern), Eigaard, O. R. (Intern), Boje, J. (Intern)
Publication date: 2013
Event: Poster session presented at Society of Experimental Biology, Annual Main Meeting, Valencia, Spain.
Main Research Area: Technical/natural sciences
Individual behaviour of Baltic cod (Gadus morhua) in relation to sex and reproductive state

Information from data storage tags (DSTs) is conventionally used to infer movement patterns or reveal characteristics (e.g. temperature or salinity) of the environment surrounding tagged fish. Here we link data derived from DSTs with the reproductive physiology of tagged fish. Individual vertical activity of adult male and female Atlantic cod Gadus morhua L. in the Bornholm Basin was derived from DST measures and related to the individual histologically determined reproductive phase. Spawning migrations were identified by movements towards deeper and more saline waters. No difference was observed between sexes in the timing of the onset of migration and the duration of migration from feeding grounds to the spawning area. While there was no significant difference in duration of the spawning period between females and males, the histological indices suggest that females finish spawning before males. Irrespective of gender, vertical swimming activity was most pronounced during spawning, with descents towards the bottom dominating the movements. During spawning, males stayed significantly deeper than females. In conclusion, the present results suggest that initiation of spawning migration and duration of the spawning period differs between sexes, as does the level of activity during spawning events. Not all individuals followed the general pattern; a considerable number of individuals were found to spawn in shallow water in the Arkona Basin, and juvenile fish undertook the migration without spawning.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography
Authors: Nielsen, B. (Ekstern), Hüsey, K. (Intern), Neuenfeldt, S. (Intern), Tomkiewicz, J. (Intern), Behrens, J. (Intern), Andersen, K. H. (Intern)
Pages: 197-207
Publication date: 2013
Main Research Area: Technical/natural sciences

Publication information
Journal: Aquatic Biology
Volume: 18
Issue number: 2
ISSN (Print): 1864-7782
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 0.847 SNIP 0.895 CiteScore 1.82
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.767 SNIP 0.713 CiteScore 1.41
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.681 SNIP 0.678 CiteScore 1.44
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.641 SNIP 0.618 CiteScore 1.34
ISI indexed (2013): ISI indexed no
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.814 SNIP 0.813 CiteScore 1.7
ISI indexed (2012): ISI indexed no
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.844 SNIP 0.848 CiteScore 1.79
ISI indexed (2011): ISI indexed no
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.899 SNIP 0.666
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.631 SNIP 0.483
Spawning migration and behavior of Baltic cod (Gadus morhua) based on DST-derived individual information

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography
Authors: Behrens, J. (Intern), Nielsen, B. (Ekstern), Hüussy, K. (Intern), Neuenfeldt, S. (Intern), Andersen, K. H. (Intern), Tomkiewicz, J. (Intern)
Publication date: 2013
Main Research Area: Technical/natural sciences
Publication: Research › Poster – Annual report year: 2013

Correlations between hemoglobin type and temperature preference of juvenile Atlantic cod Gadus morhua

Atlantic cod (Gadus morhua L.) exhibits polymorphic hemoglobin variants with the Hbl locus showing a strong North-South geographic cline in frequency distribution of three main types (1/1, 1/2 and 2/2). This may indicate selective advantages of the different Hbl types under various temperature regimes. Despite this only one study has directly examined the temperature preference of the two homozygous types, Hbl-1/1 and Hbl-2/2, whereas the preference of the heterozygote (Hbl-1/2) has never previously been addressed.

By exposing fish to a 4–19 °C temperature gradient in an annular preference chamber we recorded the preferred temperature of wild juvenile G. morhua of all three main Hbl types originating from an area where they co-exist. Hbl-2/2 G. morhua preferred significantly cooler water (8.9±0.2 °C) compared to the Hbl-1/1 group (11±0.6 °C), this difference, however, not being as distinct as previously reported. There was pronounced inter-individual variation in the temperature preference of the Hbl-1/2 G. morhua ranging between 6.7 and 13.8 °C, and their overall preference (10.5±0.9 °C) did not differ significantly from either of the homozygous Hbl types. Notably, the mean range of utilized temperature (temperature span between 1st and 3rd quartile) was very similar between all 3 Hbl types with 3.2–3.5 °C. Considering the complexity of a trait like temperature preference, there are clearly many other factors besides Hbl type that influence the thermal biology of cod, and therefore we also investigated possible associations between genotype and temperature preference for 12 variable candidate gene single nucleotide polymorphisms (SNPs) a priori expected to be related to growth and reproduction. There were, however, no significant correlations between temperature preference and any of the candidate gene SNPs indicating that none of these polymorphisms strongly associates with thermal behavior. Considering however the high-throughput genotyping methods becoming increasingly accessible there is great potential for association studies involving many more genetic markers to identify additional genetic polymorphisms that are important for temperature preference in G. morhua. In conclusion, we support the notion of a ‘warm’ (Hbl-2/2) and a ‘cold’ (Hbl-1/1) Hb type, although we suggest the difference to be more subtle than previously reported. Furthermore Hbl-1/2 G. morhua shows rather inconsistent thermoregulatory behavior. To obtain a more definitive picture of the extent to which thermal niches are realized under natural conditions field observations in areas where the 3 Hbl types co-exist should be performed.

General information
State: Published
Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources
Authors: Behrens, J. W. (Intern), Gräns, A. (Ekstern), Therkildsen, N. O. (Intern), Neuenfeldt, S. (Intern), Axelsson, M. (Ekstern)
Effects of hypoxic exposure during feeding on SDA and postprandial cardiovascular physiology in the Atlantic cod, Gadus morhua

Some Atlantic cod in the Bornholm Basin undertake vertical foraging migrations into severely hypoxic bottom water. Hypoxic conditions can reduce the postprandial increase in gastrointestinal blood flow (GBF). This could subsequently postpone or reduce the postprandial increase in oxygen consumption (MO2), i.e. the SDA, leading to a disturbed digestion. Additionally, a restricted oxygen uptake could result in an oxygen debt that needs to be compensated for upon return to normoxic waters and this may also affect the ability to process the food. Long-term cardio-respiratory measurements were made on fed G. morhua in order to understand how the cardio-respiratory system of feeding fish respond to a period of hypoxia and a subsequent return to normoxia. These were exposed to 35% water oxygen saturation for 90 minutes, equivalent to the time and oxygen level cod voluntarily endure when searching for food in the Bornholm Basin. We found that i) gastric and intestinal blood flows, cardiac output and MO2 increased after feeding, ii) gastric and intestinal blood flows were spared in hypoxia, and iii) there were no indications of an oxygen debt at the end of the hypoxic period. The magnitude and time course of the measured variables are similar to values obtained from fish not exposed to the hypoxic period. In conclusion, when cod in the field search for and ingest prey under moderate hypoxic conditions they appear to stay within safe limits of oxygen availability as we saw no indications of an oxygen debt, or negative influence on digestive capacity, when simulating field observations

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Population Ecology and Genetics
Authors: Behrens, J. (Intern), Axelsson, M. (Ekstern), Neuenfeldt, S. (Intern), Seth, H. (Ekstern)
Pages: e46227
Publication date: 2012
Main Research Area: Technical/natural sciences

Publication information
Journal: PLOS ONE
Volume: 7
Issue number: 9
ISSN (Print): 1932-6203
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 3.11 SJR 1.201 SNIP 1.092
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.414 SNIP 1.131 CiteScore 3.32
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.545 SNIP 1.141 CiteScore 3.54
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.74 SNIP 1.147 CiteScore 3.94
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Precautionary sandeel fishery in Natura 2000 areas on the Dogger Bank (North Sea): a way to comply with MSFD implementation?

General information
State: Published
Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources, Section for Management Systems, Section for Coastal Ecology
Authors: Behrens, J. (Intern), Tørring, P. (Ekstern), Eigaard, O. R. (Intern), Dinesen, G. E. (Intern), Pedersen, E. M. (Intern), Sørensen, T. K. (Intern), Mosegaard, H. (Intern)
Publication date: 2012
Main Research Area: Technical/natural sciences
Publication: Research - peer-review › Journal article – Annual report year: 2012

Is feeding under hypoxic conditions a good strategy? Insight from cardio-respiratory measurements on cod

General information
State: Published
Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources
Authors: Behrens, J. (Intern), Seth, H. (Ekstern), Neuenfeldt, S. (Intern), Axelsson, M. (Ekstern)
Publication date: 2011
Event: Abstract from Society of Experimental Biology Annual Main Meeting, Glasgow, Scotland.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 278588
Publication: Research › Conference abstract for conference – Annual report year: 2011

Primary versus secondary drivers of foraging activity in sandeel schools (Ammodytes tobianus)

General information
State: Published
Recovery of gastric evacuation rate in Atlantic cod Gadus morhua L. surgically implanted with a dummy telemetry device

General information
State: Published
Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources
Authors: Behrens, J. (Intern), Gräns, A. (Ekstern), Andersen, N. G. (Intern), Neuenfeldt, S. (Intern), Axelsson, M. (Ekstern)
Pages: 240-246
Publication date: 2011
Main Research Area: Technical/natural sciences

Publication information
Journal: Laboratory Animals
Volume: 45
Issue number: 4
ISSN (Print): 0023-6772
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 0.69 SNIP 0.796 CiteScore 1.36
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.642 SNIP 0.707 CiteScore 1.35
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.536 SNIP 0.783 CiteScore 1.13
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.386 SNIP 0.56 CiteScore 0.95
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.522 SNIP 0.784 CiteScore 1.32
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.509 SNIP 0.709 CiteScore 1.25
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.557 SNIP 0.761
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.578 SNIP 1.036
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.405 SNIP 0.759
Scopus rating (2007): SJR 0.355 SNIP 0.687
Influence of moderate and severe hypoxia on the diurnal activity pattern of lesser sandeel Ammodytes tobianus

General information
State: Published
Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources, Danish Shellfish Centre
Authors: Behrens, J. (Intern), Petersen, J. K. (Intern), Ærtebjerg, G. (Ekstern), Steffensen, J. (Ekstern)
Pages: 538-551
Publication date: 2010
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Fish Biology
Volume: 77
Issue number: 3
ISSN (Print): 0022-1112
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.57 SJR 0.741 SNIP 0.882
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.951 SNIP 0.935 CiteScore 1.64
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.944 SNIP 0.934 CiteScore 1.76
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.049 SNIP 1.118 CiteScore 1.98
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.93 SNIP 1.035 CiteScore 1.88
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Time matters: post-surgical recovery of gastric evacuation rate in Atlantic cod

During the last decades, new technology has allowed collection of physiological and behavioral data from free-ranging specimen, minimizing stress and providing more reliable data than traditional methods. However, such biotelemetric methods demands surgical introduction of a foreign object into the fish, which may affect the animal, and studies dealing with the affect of surgery and implants are still scarce. A variable known to be sensitive to postsurgical and other stressors is the gastric evacuation rate (GER). GER is tightly linked to gut blood flow and in the present study we analysed how GER was affected after surgically introducing dummies of a blood-flow biotelemetry system into the abdominal cavity of Atlantic cod. Two days post surgery the cod with implants were, together with a control group, force-fed a standardized meal and the stomach contents recovered 24h later. This procedure was repeated for both groups of fish after one additional week of recovery. After two days GER was significantly lower in the group of fish with surgical implants compared to the control group, but the difference was not maintained after one additional week of recovery. We conclude that 10 days of postsurgical recovery will stabilize GER in cod. The results indicate that the presence of the implant per se did not affect GER but that the effects observed came from surgery and/or postsurgical stress. 10 days should consequently be a starting point for future studies even if longer recovery periods will probably be beneficial to the animal.

General information
State: Published
Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources
Authors: Behrens, J. (Intern), Gräns, A. (Ekstern), Andersen, N. G. (Intern), Neuenfeldt, S. (Intern), Axelsson, M. (Ekstern)
Publication date: 2010
Event: Poster session presented at Society for Experimental Biology Annual Main Meeting, Praque, .
Main Research Area: Technical/natural sciences
Adaptive behaviour of Baltic cod feeding in hypoxic water

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources
Authors: Neuenfeldt, S. (Intern), Thygesen, U. H. (Intern), Behrens, J. (Intern)
Pages: 1-3
Publication date: 2009

Host publication information
Title of host publication: ICES C.M.
Volume: B:08
Publisher: International Council for the Exploration of the Sea
Main Research Area: Technical/natural sciences

Bibliographical note
Extended abstract
Source: orbit
Source-ID: 251169
Publication: Research › Article in proceedings – Annual report year: 2009

Oxygen deficiency impacts on burying habitats for lesser sandeel, Ammodytes tobianus, in the inner Danish waters
Starting in 1980s, the inner Danish waters have yearly been exposed to seasonal oxygen deficiency (hypoxia). Through spatial–temporal interpolation of monitoring data (1998–2005), we investigated oxygen deficiency impacts on suitable burying habitats for lesser sandeel (Ammodytes tobianus). Furthermore, the consequences of a predicted 4 °C temperature increase within this century were investigated. Maps of bottom oxygen deficiency (oxygen saturation ≤ Scrit of sandeel) were overlaid on maps of sediment composition. Throughout the study period (1998–2005), about 8% of the suitable sediments were affected by oxygen deficiency during an average year and 23% in the most severe year. Regional differences underlay the interannual variations. The extent of oxygen deficiency in enclosed regions varied from 20% to 33% of the suitable seabed being affected, whereas in open-water regions oxygen deficiency problems were limited during average years. However, large areas of the open-water seabed experienced oxygen deficiency during severe years. In such years, under a 4.0 °C temperature increase scenario, the extent of oxygen deficiency on open-water suitable patches was predicted to increase from 25% to about 40%.

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Department of Environmental Science and Engineering, Danish Shellfish Centre
Authors: Behrens, J. (Intern), Ærtebjerg, G. (Ekstern), Petersen, J. K. (Intern), Carstensen, J. (Ekstern)
Pages: 883-895
Publication date: 2009
Main Research Area: Technical/natural sciences

Publication information
Journal: Canadian Journal of Fisheries and Aquatic Sciences
Volume: 66
Issue number: 6
ISSN (Print): 0706-652X
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 2.56 SJR 1.322 SNIP 1.163
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.256 SNIP 1.051 CiteScore 2.22
Using biotelemetry to investigate cardiovascular tradeoffs in cod feeding under hypoxic conditions

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources
Authors: Behrens, J. (Intern), Thygesen, U. H. (Intern), Neuenfeldt, S. (Intern)
Publication date: 2009
Thermodynamics of oxygenation-linked proton and lactate binding govern the temperature sensitivity of O2 binding in crustacean (Carcinus maenas) hemocyanin

General information
State: Published
Organisations: Aarhus University
Authors: Weber, R. E. (Ekstern), Behrens, J. (Intern), Malte, H. (Ekstern), Fago, A. (Ekstern)
Pages: 1057-1062
Publication date: 2008
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Experimental Biology
Volume: 211
Issue number: 7
ISSN (Print): 0022-0949
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 2.62 SJR 1.722 SNIP 1.279
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.812 SNIP 1.222 CiteScore 2.4
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.722 SNIP 1.331 CiteScore 2.51
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.719 SNIP 1.323 CiteScore 2.75
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.612 SNIP 1.395 CiteScore 2.91
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.534 SNIP 1.315 CiteScore 2.77
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.474 SNIP 1.341
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.764 SNIP 1.365
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.91 SNIP 1.363
Web of Science (2008): Indexed yes
Effect of Global Change related oxygen depletion on fish; lesser sandeel (Ammodytes tobianus) as a model organisms

General information
State: Published
Organisations: University of Copenhagen
Authors: Behrens, J. (Intern)
Number of pages: 46
Publication date: 2007

Publication information
Original language: English
Main Research Area: Technical/natural sciences
Links:
http://www2.dmu.dk/Pub/PHD_JWB.pdf

Bibliographical note
PhD Thesis at: Marine Biological Laboratory, University of Copenhagen and Department of Marine Ecology, NERI. National Environmental Research Institute, Denmark
Source: orbit
Source-ID: 251161
Publication: Research › Ph.D. thesis – Annual report year: 2007

Oxygen dynamics around buried lesser sandeel, Ammodytes tobianus (Linnaeus, 1785); mode of ventilation and metabolic requirements

General information
State: Published
Organisations: University of Copenhagen
Authors: Behrens, J. (Intern), Stahl, H. J. (Ekstern), Steffensen, J. F. (Ekstern), Glud, R. N. (Ekstern)
Pages: 1006-1014
Publication date: 2007
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Experimental Biology
Volume: 210
Issue number: 6
ISSN (Print): 0022-0949
The effect of hypoxia on behavioural and physiological aspects of lesser sandeel, Ammodytes tobianus (Linnaeus, 1785)

General information
State: Published
Organisations: University of Copenhagen
Authors: Behrens, J. (Intern), Steffensen, J. F. (Ekstern)
Pages: 1365-1377
Publication date: 2007
Main Research Area: Technical/natural sciences

Publication information
Journal: Marine Biology
Volume: 150
Issue number: 6
ISSN (Print): 0025-3162
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.41 SJR 1.198 SNIP 0.993
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.315 SNIP 0.932 CiteScore 2.21
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.204 SNIP 1.041 CiteScore 2.32
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.272 SNIP 1.064 CiteScore 2.4
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.306 SNIP 1.107 CiteScore 2.43
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.145 SNIP 1.073 CiteScore 2.22
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.235 SNIP 1.069
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.178 SNIP 1.052
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.236 SNIP 1.022
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.348 SNIP 1.21
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.195 SNIP 1.09
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.253 SNIP 1.198
Tobisens strategi til at få lit når den er nedgravet, og effekten af hypoxi på fiskens aktivitet

General information
State: Published
Organisations: University of Copenhagen, Dansk Skaldyrcenter
Authors: Behrens, J. (Intern), Glud, R. (Ekstern), Stahl, H. (Ekstern), Ærtebjerg, G. (Ekstern), Petersen, J. K. (Intern), Steffensen, J. (Ekstern)
Publication date: 2007
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 251164
Publication: Research - peer-review › Journal article – Annual report year: 2007

Oxygen deficiency impacts on habitats for lesser sandeel in the inner Danish waters

General information
State: Published
Organisations: University of Copenhagen, Danish Shellfish Centre
Authors: Behrens, J. (Intern), Carstensen, J. (Ekstern), Ærtebjerg, G. (Ekstern), Petersen, J. K. (Intern)
Publication date: 2006
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 251195
Publication: Research › Conference abstract for conference – Annual report year: 2006

Visualisation of how buried lesser sandeel (Ammodytes tobianus)obtain oxygen – and evidence of a fish capable of metabolic depression

General information
State: Published
Organisations: Unknown
Authors: Behrens, J. (Intern), Staaahl, H. (Ekstern), Steffensen, J. (Ekstern), Glud, R. (Ekstern)
Publication date: 2006
Event: Abstract from VIIth International Congress on the Biology of Fish, St. Johns, Canada, .
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 251196
Publication: Research › Conference abstract for conference – Annual report year: 2006
Swimming energetics of the Barents Sea capelin (Mallotus villosus) during the spawning migration period

General information
State: Published
Organisations: University of Copenhagen
Authors: Behrens, J. (Intern), Præbel, K. (Ekstern), Steffensen, J. F. (Ekstern)
Pages: 208-216
Publication date: 2005
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Experimental Marine Biology and Ecology
Volume: 331
Issue number: 2
ISSN (Print): 0022-0981
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.03 SJR 0.937 SNIP 0.914
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.043 SNIP 0.823 CiteScore 1.87
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.145 SNIP 1.045 CiteScore 2.41
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.294 SNIP 1.08 CiteScore 2.45
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.186 SNIP 1.021 CiteScore 2.27
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.067 SNIP 1.007 CiteScore 2.14
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.239 SNIP 1.017
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.299 SNIP 1.208
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 1.26 SNIP 1.134
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.214 SNIP 1.308
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.262 SNIP 1.247
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.164 SNIP 1.134
The response of lesser sandeel (Ammodytes tobianus) to acute hypoxia; swimming activity and physiological stress

General information
State: Published
Organisations: Unknown
Authors: Behrens, J. (Intern), Steffensen, J. (Ekstern)
Publication date: 2005
Event: Poster session presented at Society for Experimental Biology Main Meeting, Barcelona, Spain.
Main Research Area: Technical/natural sciences

Bibliographical note
Poster no. A9.31
Source: orbit
Source-ID: 251193
Publication: Research Poster – Annual report year: 2005

Functional conservation of subfamilies of Putative UDP-N-acetylgalactosamine:Polypeptide N-Acetylgalactosaminyltransferases in Drosophila, Caenorhabditis elegans, and mammals

General information
State: Published
Organisations: University of Copenhagen, University of Southern Denmark
Authors: Schwientek, T. (Ekstern), Bennett, E. P. (Ekstern), Flores, C. (Ekstern), Thacker, J. (Ekstern), Hollmann, M. (Ekstern), Reis, C. A. (Ekstern), Behrens, J. (Intern), Mandel, U. (Ekstern), Keck, B. (Ekstern), Schäfer, M. A. (Ekstern), Haselmann, K. (Ekstern), Zubarev, R. (Ekstern), Roepstorff, P. (Ekstern), Burchell, J. M. (Ekstern), Taylor-Papadimitriou, J. (Ekstern), Hollingsworth, M. A. (Ekstern), Clausen, H. (Ekstern)
Pages: 22623-22638
Publication date: 2002
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Biological Chemistry
Volume: 277
Issue number: 25
ISSN (Print): 0021-9258
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 4.17 SJR 2.755 SNIP 1.125
The archaeogastropod mollusc Haliotis iris: tissue and blood metabolites and allosteric regulation of haemocyanin function
Allosteric regulation of haemocyanin functions in Haliotis iris

General information
State: Published
Organisations: University of Canterbury
Authors: Behrens, J. (Intern), Weber, R. (Ekstern)
Publication date: 2000
Event: Abstract from Symposium for the Danish Centre for Respiratory Adaptations, Aarhus, Denmark.
Main Research Area: Technical/natural sciences

Bibliographical note
Published in: Journal of Shellfish Research, vol. 19, no. 1, p. 528

Stress and weight loss associated with handling in the blackfoot abalone, Haliotis iris

General information
State: Published
Organisations: Unknown
Authors: Ragg, N. (Ekstern), Taylor, H. (Ekstern), Behrens, J. (Intern)
Publication date: 2000
Event: Abstract from 4th International Abalone Symposium, Cape Town, South Africa.
Main Research Area: Technical/natural sciences

Bibliographical note
Published in: Journal of Shellfish Research, vol. 19, no. 1, p. 528

Projects:

Influence of Parasite Load on the Growth and Bioenergetics of Baltic cod

National Institute of Aquatic Resources
Period: 01/08/2017 → 31/07/2020
Number of participants: 3
PhD Student:
Plambech, Marie (Intern)
Supervisor:
Skov, Peter Vilhelm (Intern)
Main Supervisor:
Behrens, Jane (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Samfinansieret - Andet
Project: PhD
The invasive round goby in Danish waters: Investigations of depth distributions in relation to a targeted, efficient fishery after the species for human consumption (39402)

Round goby is an invasive benthic fish, native to the Ponto-Caspian region. It has on several occasions been introduced to the Baltic region, and is now widespread here, with established populations in many areas. In some areas it dominates the local fish fauna, having out-competed native, and often commercially important, fish species.

Round goby is generally referred to as a coastal, shallow-water species. Yet, when temperatures drop at the onset of winter, the fish disappear from the shallow, cool waters, presumably to migrate to deeper, water waters. How deep they go, and how the onset of migration to deeper waters may relate to temperature (and hence season) however remains unknown. This information is nevertheless imperative in an evaluation of when, at what depths, and with what type of gear a potential targeted fishery after round goby should occur.

The present project will use all available national and international survey data throughout the Baltic region to map depths distributions of round goby, and analyze the correlations between depth distributions and temperature.

The project is coordinated by DTU Aqua.

The project is funded by Direktør J.P. A. Espersen og hustru fru Dagny Espersens Fond.

National Institute of Aquatic Resources
Section for Marine Living Resources
Period: 01/01/2017 → 31/12/2017
Number of participants: 1
Research area: Marine Living Resources
Project Coordinator:
Behrens, Jane (Intern)

Effects of seal-related liver worm on Baltic cod growth and mortality (39411)

The number of grey seals has increased markedly in the Baltic Sea within recent years. Grey seal is final host for the liver worm *Contrarceum osculatum*, where cod is one of several transport hosts. Concurrent with the rise in number of grey seal, the prevalence (number of infected cod) and intensity of infection (number of liver worms per infected cod) with liver worm has increased, and up to 340 worms can now be found in single cod livers. Field studies have shown that intensity of infection correlates negatively with the condition of the fish, indicating that liver worm may have a negative effect on the health status of the fish. Yet, from field investigations it is difficult to separate potentially negative effects of liver worms from that of reduced food availability or poor oxygen conditions.

In the present study we will perform controlled laboratory experiments to i) determine the potential costs of housing liver worm, ii) estimate the effects of liver worm on cod growth and mortality, and iii) use data generated in i) and ii) in bioenergetic modeling to calculate the effect of liver worm on the maximal food consumption and growth of individual cod. This will subsequently be scaled to the level of the population.

The projects is coordinated by University of Copenhagen.

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

National Institute of Aquatic Resources
Section for Marine Living Resources
University of Copenhagen
Danish Fishermen's Association
Period: 08/09/2016 → 15/12/2018
Number of participants: 3
Research area: Marine Living Resources
Project participant:
Skov, Peter Vilhelm (Intern)
Andersen, Niels Gerner (Intern)
Project Manager, academic:
Behrens, Jane (Intern)
**Sustainable use of the invasive round goby in favour for the fishery and the environment (SORTMUND) (39336)**

The overarching aim of SORTMUND is to establish a profitable and environmentally sustainable fishery after the invasive round goby in inner Danish waters. Round goby was first seen in south-eastern Danish waters in 2008 and have since then increased rapidly in abundance along the coastline where it has severe negative effects on local biodiversity and the traditional coastal fishery. We aim to launch the fish as a high-quality Nordic product for human consumption, in addition to fur animal feed. The project covers the entire value chain, and has broad participation, ranging from local fishermen and their trade organization, the processing industry, university institutes and a Michelin restaurant. Specific activities will be estimations of stock sizes, investigations of seasonal migrations of the fish, development of seal-safe of gear to avoid damages to the catch, test of methods to fillet the fish for human consumption, documentation of nutritional quality of the fish, development of a fermented fish sauce to add umami to the food, and optimization of logistics in relation to collection, cooling and transportation of fish from small harbors to processing.

This project is coordinated by DTU Aqua.

The project is funded by the Ministry of Environment and Food of Denmark through the Green Development and Demonstration Program (GUDP).

**National Institute of Aquatic Resources**

**Section for Marine Living Resources**

**National Food Institute**

**Danish Fishermen's Association**

**Gilleleje Fillet Factory**

**Enspire**

**NF340 Lasse III**

**Gemba Seafood Consulting**

**Period:** 01/03/2016 → 28/02/2019

**Number of participants:** 4

**Research areas:** Fish Biology & Marine Living Resources

**Project participant:**

Christoffersen, Mads (Intern)

Kindt-Larsen, Lotte (Intern)

van Deurs, Mikael (Intern)

**Project Manager, academic:**

Behrens, Jane (Intern)

**Underwater time of flight image acquisition system (UTOFIA) (39240)**

This project offers a compact and cost-effective underwater imaging system for turbid environments and will fill the current gap between short-range, high-resolution conventional video and long-range low-resolution sonar systems. The camera system utilizes high frequency laser pulses synchronized with rapid shutter operations on nano second time scales to radically reduce the interference of back scatter on visual images. Using this range-gated imaging technology, the system will extend the imaging range by factor 2 to 3 over conventional video systems. At the same time, the system will provide video-rate 3D information. UTOFIA offers a new modus operandi for the main targeted domains of application: marine life monitoring, harbour and ocean litter detection, fisheries stock assessment and aquaculture, seabed mapping, offshore industry and civil security.

The project is a collaborative effort between engineering companies producing the laser components, the camera systems, the software control and processing systems as well as the deployment platforms. The project also involves companies charged with integrating the system and its commercialization into the market place. The role of DTU Aqua is twofold; it is responsible for a series of field and laboratory trials to demonstrate the proof-of-concept and to feed back into the engineering design process, and it is responsible for the exploitation and dissemination dimension of the project, particularly with respect to marine science, fisheries and aquaculture applications.

The consortium is coordinated by SINTEF, Norway.

The project is funded by EU, Horizon2020.

**National Institute of Aquatic Resources**

**Section for Oceans and Arctic**
Development of seal-safe fishing gear (Seal-Safe II) (39188)

Increasing numbers of seals in Danish waters have in recent years made it difficult to conduct a economically sustainable coastal fishery with gillnets and hooks/lines. The objective of Seal-Safe is to improve the viability of these fisheries by developing efficient, environmentally friendly and seal-safe pots for catching cod. The pots will make it possible for the coastal fishermen to conduct a sustainable fishery without damages inflicted by seals.

The specific goal of Seal-Safe is to increase the catch rate to at least 4 kg cod per pot per day. Seal-Safe will attain this through a combination of fishing trials on board commercial fishing vessels and research into the behaviour of fish and seals around the pots.

This project is coordinated by DTU Aqua.

The project is funded by the Danish Ministry of Food, Agriculture and Fisheries through the Green Development and Demonstration Program (GUDP).

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Aarhus University
Sveriges Lantbruksuniversitet
Neksø Vodbinderi

Round goby – need for collaborative science and management in Nordic and Baltic countries (39171)

Originating from the Ponto-Caspian region, the round goby Neogobius melanostomus has within recent years proliferated in several Nordic and Baltic coastal waters. Round goby is now not only posing a threat to native goby species occupying similar habitats, but also to the traditional coastal fishery through competition for food resources with commercially and recreationally important coastal species, and consumption of their fry and eggs. Furthermore, fishermen report on declined
shrimp catches, one of the preferred prey items of adult round goby. The overarching aim of this project is to have a common Nordic and Baltic workshop on round goby. This will enable knowledge transfer across borders, identification of knowledge gaps and creating wide research projects on issues related to round goby invasion. Equally important, it would provide an opportunity to inform relevant authorities on the challenges of managing the species and to develop instruments to mitigate the impact on native coastal species and fisheries. Outcome of the workshop will be a report on the current distribution and status of round goby in the Nordic/Baltic countries that could be used for future risk analyses and basis for management decisions, indicating future needs. The project is coordinated by DTU Aqua.

National Institute of Aquatic Resources
Section for Marine Living Resources
Finnish Environment Institute
Lund University
University of Tartu
Period: 01/05/2014 → 31/05/2014
Number of participants: 2
Research area: Marine Populations and Ecosystem Dynamics
Project participant: van Deurs, Mikael (Intern)
Project Coordinator: Behrens, Jane (Intern)

Biodiversity changes - causes, consequences and management implications (BIO-C3) (39117)

BIO-C3 will investigate the dynamics of biodiversity in the Baltic Sea, their causes and the consequences for the function of food webs, including implications for biodiversity management policies.

Baltic biodiversity is historically dynamic responding to various drivers operating at different time and space scales. Species diversity is generally low and contains many recent immigrants and glacial relict species because of low salinity and relatively young age. Nevertheless, Baltic food webs sustain many goods and services valued by society.

We focus on functional consequences of ongoing and projected distributional and compositional changes of benthic and pelagic communities with a focus on invasive and resident key species. Using spatial and temporal projections of abiotic/biotic drivers including their interaction (climate change, eutrophication, species invasions, fisheries), we will assess how biodiversity (e.g., of species, traits, habitats) responds in time, space and along gradients of human impact and hydrography. We will investigate the potential and genetic basis for colonisation, acclimation and adaptation of species and populations to the Baltic Sea, and how compositional and adaptive changes of Baltic biodiversity affect ecosystem functions with an emphasis on trophic linkage and food web dynamics.

Results will feed into impact assessments that guide management policies including improved operationalization of status indicators, and guidelines for MPAs.

The project is coordinated by Helmholtz Centre for Ocean Research, Kiel (GEOMAR). DTU Aqua is co-coordinator.

The project is funded equally by EU, BONUS (Science for a Better Future of the Baltic Sea Region), ERA-NET.

National Institute of Aquatic Resources
Section for Marine Ecology and Oceanography
GEOMAR - Helmholtz Centre for Ocean Research Kiel
University of Hamburg
Stockholm University
National Marine Fisheries Research Institute
University of Tartu
Finnish Environment Institute
Klaipeda University
DHI Denmark
Selective and low impact gear for fishing live nephrops (39042)

The Danish nephrops fishery is important with an annual value of the landings of approximately 300m DDK. The quota is high as many nephrops inhabit the inner Danish waters. However, cod is a frequent by-catch which is problematic due to low cod quotas, and resultantly, nephros quota a rarely fully exploited. Furthermore, nephrops are traditionally fished with bottom trawl which exert high impact on the seabed. The first aim of the project is to solve the cod by-catch issues by using trawling speed as a selective mechanism, which will take advantage of the superior swimming capabilities of cod as compared to nephrops. Lowering the trawling speed will enable cod to escape the trawl while still ensuring nephrops catch. The second aim is to design and implement a new type of trawl doors that do not touch the seabed and highly reduce impact of the sweeps. Besides, materials used for the new trawl will be produced in much lighter and stronger materials than the traditional trawls. Altogether this reduces the drag in the water and fuel consumption considerably. Trawling at a lower speed lessens the mechanical damage to the nephrops and this enhances their chances of survival. The project will take this one step further by establishing gentle handling routines on board the ships, in addition to appropriate conditions for keeping live animals. Physiological tests will define threshold levels in relation to temperature, light and moist, and characterise the most favourable conditions for further survival. Besides optimising conditions on board the ships this knowledge will be used in relation to temporary storage and to ensure optimal conditions during transport of live nephrops to southern Europe. The final aim of the project is thus to establish an export chain of live nephros to markets in southern Europe. This can provide the fishermen up to three times the price as compared to when landing nephrops on ice, and the price that the Danish export companies’ gain will likewise increase.

Within the project we successfully developed and tested pelagic doors for use in the nephrops fishery, showing that it is indeed possible to implement these in this fishery. Using reduced speed as a way to allow escape of round fish from the trawl (i.e reduce catch of these) did however not work as anticipated, and cannot be recommended for future practice. We tested the effects on survival of nephrops of sprinkling with fresh seawater on-board after trawling, light- and air exposure and various temperatures. Of these, air exposure and air temperature (the higher the worse) had the greatest effect on survival and in determining the period it took for nephrops to recover from post trawling and handling stress. Furthermore, a ‘one-tough’ packing system, including optimal conditions for the animals when transported, was successfully developed, tested and implemented, resulting in up to 95% survival of nephrops transported by truck to southern Europe. Finally, a manual with guidelines for optimal practice for fishery and export of live nephrops was made.

The project was coordinated by AquaMind and CATch-Fish.

The project was funded by Danish Ministry of Food, Agriculture and Fisheries through the Green Development and Demonstration Program (GUDP).

National Institute of Aquatic Resources
Monitoring and modelling vertical movements of Greenland halibut in Disko Bay (38795)

The project measured and parameterized Greenland halibut behaviour in terms of vertical movement patterns by means of data storage tags. The tags were released (and recaptured) prior to the project period under another project, so that data was available at start of the project.

Previous measurements using Data Storage tags on halibut tagged in Disko Bay have shown that the halibut undertake distinct vertical migrations of several hundred meters at a time during a few hours.

The findings in the project from analyses of the previous tagging’s gave important biological information on the seasonal migration patterns for Greenland halibut in the West Greenland Fjords; icefjords are mainly preferred as wintering habitat for the fish while the outer parts of the fjord systems are summer habitats. Further, the study showed that halibut are fast vertical swimmers most likely when chasing pelagic prey fishes.

The project was coordinated by DTU Aqua.

The project was funded by the Commission for Scientific Investigations in Greenland (KVUG).

National Institute of Aquatic Resources

Arctic Section

Cardio-respiratory adaptations in cod feeding under hypoxic conditions (CarlsbergTorsk) (38851)

Employment of DataStorage Tags on individual Atlantic cod (Gadus morhua) in the Bornholm Basin has shown that some fish migrate towards the deeper basin centre, presumably to feed. During these voluntary dives, fish expose themselves to oxygen saturations as low as 10 % and many individuals spend a third of their total time at oxygen saturation <50 %. This
behavior may either be a result of an optimum foraging strategy or a necessity due to limited or less accessible prey in the cod’s optimal habitats.

Feeding induces several cardio-respiratory changes to enable the animal to efficiently digest, absorb, and redistribute the nutrients. Gastrointestinal blood flow (GBF) increases profoundly to facilitate digestion and absorption of the food. However, under circumstances of low oxygen availability, regional blood flow must be altered and in unfed fish there is a redistribution of blood away from the gastrointestinal area. If GBF is curtailed while the fish search for and ingest prey in the hypoxic water, this may implicate impaired digestive capacity following the return to well-oxygenated waters, either by prolonging gastric evacuation time or by reducing the assimilation efficiency. Furthermore, if the fish face the limitations of a reduced metabolic scope the onset of anaerobic energy production will result in an oxygen debt which has to be paid back with subsequent return to more well-oxygenated water. Using state-of-the-art methods (including both ‘hardwired’ and biotelemetry equipped animals) the aim is to investigate whether (1) ingestion of prey and initiation of digestion in hypoxic water results in an oxygen debt which has to be paid back following return to more well-oxygenated water, and whether (2) GBF will be spared or curtailed under the same circumstances, and if the latter, whether this will influence the digestive processes subsequent return to normal oxygen conditions.

We found that fish after 48 hr of post-surgical recovery following surgical implantation of a dummy biotelemetry blood flow device had reduced gastric evacuation rate as compared to controls; 24-48 hr recovery is normal standard allowed for post-surgical recovery for fish when they are ‘hard-wired’. However after ten days of recovery gastric evacuation rate was comparable to that of control fish – this long recovery time is possible only when using biotelemetry systems. Furthermore, when exposed to oxygen conditions simulating the low levels in the Bornholm Basin (the Baltic Sea) into which the fish voluntarily undertake feeding migrations, we found that GBF is not negatively impacted, as long as the fish subsequently is allowed to return to more well-oxygenated waters. We thus suggest that short feeding migrations into hypoxic bottom waters is a viable strategy under conditions where food is limited in the more well-oxygenated water layers.

The project was coordinated by DTU Aqua.
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National Institute of Aquatic Resources
Section for Marine Ecology and Oceanography
University of Gothenburg
Period: 01/01/2009 → 31/05/2012
Number of participants: 4
Research areas: Marine Populations and Ecosystem Dynamics & Fish Biology & Marine Living Resources
Project participant:
Neuenfeldt, Stefan (Intern)
Thygesen, Uffe Høgsbro (Intern)
Mosegaard, Henrik (Intern)
Project Manager, academic:
Behrens, Jane (Intern)
Project

Influence of ecological dynamics and climate change on the marine environment in Danish waters (ECODYN) (38136)
The environment in the open Danish waters is controlled by a complex interplay between physical and biological processes, and it is therefore difficult to determine the exact cause of changes in the environment. This is also the situation for hypoxia, which is caused both by nutrients from sources ashore, by ecological dynamics of the waters, and by the flow in Kattegat and the Belts. This project examined the marine environment through three-dimensional numerical models which describe both physical and biological processes. In parallel, laboratory experiments clarified how temperature affects the biological rates at or near the sea floor. This was used to model the response of the ecosystem to the temperature increases which are expected as a result of climate change, and the future consequences for the marine environment were analyzed.

Through model simulations and oxygen measurements from ships and buoys, the biological processes leading to hypoxia were determined with the so far highest resolution in time and space; this contributed significantly to the understanding of the functioning of the ecosystem in this area.

The connection between the state of the marine environment and the abundance of fish was analyzed, focusing on the distribution and spawning regions of cod, in relation to the oxygen conditions in the inner Danish waters and in the Baltic Sea. Thereby, the project provided a description of interconnections between the ecosystem, the water flow, and the effects of a changing climate.

The project was coordinated by Department of Bioscience, Aarhus University, Denmark.
The project was funded by the Danish Council for Strategic Research.
Activities:

**ICES - The Workshop on Scoping for Integrated Baltic Cod Assessment - WKSIBCA (External organisation)**
Period: 2014
Jane Behrens (Participant)
National Institute of Aquatic Resources
Section for Marine Ecology and Oceanography
Degree of recognition: International

**Related external organisation**

**ICES - The Workshop on Scoping for Integrated Baltic Cod Assessment - WKSIBCA**
Activity: Membership › Membership of committees, commissions, boards, councils, associations, organisations, or similar

**17. Danske havforskermøde**
Period: 21 Jan 2013 → 23 Jan 2013
Jane Behrens (Speaker)
National Institute of Aquatic Resources
Section for Marine Ecology and Oceanography

**Related event**

**17. Danske havforskermøde**
21/01/2013 → 23/01/2013
Roskilde, Denmark
Activity: Talks and presentations › Conference presentations