Feed intake as explanation for density related growth differences of common sole Solea solea

Growth of common sole Solea solea is negatively correlated to density, which affects productivity in culture and hence commercial success. Studies of individual feed intake were performed to examine growth and population dynamics at different densities. Three initial stocking densities: 1.0, 2.1 and 3.9 kg m\(^{-2}\) of individually tagged sole, referred to as low density (LD), medium density and high density HD), were examined during 145 days. Despite that tank productivity (g m\(^{-2}\) day\(^{-1}\)), was highest for the HD group, the specific growth rate (SGR) decreased significantly with increase in stocking density. Individual size variation was similar between densities, indicating that growth was not associated with hierarchy and dominant behaviour. Individual data indicated that increased density reduced the growth potential of all individuals in a population. Individual feed intake was positively correlated to both fish size and individual SGR. Feed conversion ratio was likewise positively correlated to feed intake. The relative feed intake (g feed g fish\(^{-1}\)) was not correlated to fish size at any density tested, but was significantly highest for the LD population. This explains a substantial part of the better growth in the LD group supported by indications of better utilization of the ingested feed.
The influence of twine thickness, twine number and netting orientation on codend selectivity

Based on an experimental Baltic trawl fishery, we tested diamond mesh codends with different twine thicknesses, twine numbers (single or double), and netting orientation (T0 or T90) to quantify the effects of the twine characteristics on the size selection of cod (Gadus morhua) and plaice (Pleuronectes platessa). For a given twine thickness: going from T0 to T90 increases selectivity of cod; while going from single to double reduce it. Increasing twine thickness reduces selection but the extent depends on whether the twine is single or double and whether the netting orientation is T0 or T90. In general, the results demonstrate the benefit of using a relatively thin single twine netting to ensure the appropriate size selection with round fish and the best results were obtained using netting with a T90 orientation. For a given twine thickness going from T0 to T90 decreases selectivity of plaice. Increasing twine thickness reduces selection for plaice. Our results demonstrate that very different selectivity results can be obtained using the same mesh size, simply by varying the twine thickness, the twine number, and the netting orientation. In some fisheries, the size selectivity could be improved considerably by adjusting these simple design parameters alternatively to produce more advanced and complex designs.

General information

State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, National Marine Fisheries Research Institute, Thünen Institute of Baltic Sea Fisheries
Authors: Herrmann, B. (Intern), Wienbeck, H. (Ekstern), Moderhak, W. (Ekstern), Stepputtis, D. (Ekstern), Krag, L. A. (Intern)
Pages: 22-36
Publication date: 2013
Main Research Area: Technical/natural sciences
Comparing selectivity of a standard and turned mesh T90 codend during towing and haul-back

In this study, we compared the size selectivity of a T90 codend (netting turned by 90 degrees) with that of a standard codend made of similar netting. Sea trials were conducted in a Norway lobster directed fishery in the Kattegat-Skagerrak area, where there is a need for improved selectivity because of a severe discard problem. The codends were tested by fishing simultaneously with them in a twin trawl rig. Codend covers mounted with Minisamplers were used, which made it possible to catch individuals escaping during towing and haul-back separately. Herein we proposed a model to assess the sequential selection during towing and haul back. This model takes into account the parameter \( C_{\text{tow}} \), which can be interpreted as the proportion of fish that comes into contact with the codend meshes during towing and, thereby, has a chance of escape. Compared to the standard codend, the T90 codend retained fewer Norway lobster both below and above the legal minimum landing size (40 mm, cephalothorax length), thereby causing a reduction of commercial catch. The difference was mainly due to a significantly higher escape rate during towing for the T90 codend. For plaice below minimum landing size (27 cm), the retention was slightly but significantly higher for the T90 codend compared to the standard codend. A model developed for both codends showed that not all plaice are able to attempt escapement during the towing process. For cod, the results indicated an increased \( L_{50} \) (the length at which 50% of this species is caught) for the T90 codend, but the effect was not statistically significant, probably due to the limited number of cod retained during the sea trials. The results demonstrated that, for all three species, a significant proportion did escape during haul-back in both codends.
Net escapement of Antarctic krill in trawls

This document describes the aims and methodology of a three year project (commenced in 2012) entitled Net Escapement of Antarctic krill in Trawls (NEAT). The study will include a morphology based mathematical modeling (FISHSELECT) of different sex and maturity groups of Antarctic krill (Euphausia superba) to predict basic selective characteristics of different trawl gear and net designs. Results will be used to quantify the theoretical catch efficiency and escape mortality in different net designs and also to construct design guides, to minimize escape mortality, with descriptions of basis selective properties for krill in different trawls.
Quantifying fish escape behaviour through large mesh panels in trawls based on catch comparison data – model development and a case study from Skagerrak


Based on catch comparison data, it is demonstrated how detailed and quantitative information about species-specific and size dependent escape behaviour in relation to a large mesh panel can be extracted. A new analytical model is developed, applied, and compared to the traditional modelling approach for such data. As a case study, we used data collected with a twin trawl setup. The only difference between the two 120 mm trawls was that a 12 meter long section in the upper panel was replaced with 800 mm diamond meshes (LMTP) in one of them. Based on this very large mesh size, we assumed that all individuals that contacted the panel also escaped through it. The new analytical method was applied to quantify escape behaviour for cod, haddock, saithe and Nephrops of different sizes. There was a need to include the full gear selectivity in the trawl, and we show how this selectivity can bias the interpretation of the length based escapement behaviour over the large mesh panel. Our length based behavioural description is in good agreement with direct observations of the same species in the trawl cavity reported in literature.

Fish behaviour understanding is essential. Observations are often difficult using optical devices such as cameras. The alternative is to use catch data to reconstruct behaviour. Every fish in every haul counts. Bootstrapping can be used. An experimental catch comparison index was calculated. Length frequency distributions and catch comparison rates are not suitable to infer behavioural patterns. A full gear selectivity model was developed in which data of low lengths was deleted and double boot-strapping is used. Catching is a sequential process. Panel contact was assumed leading to escape. Flounder shows strong length dependent escape behaviour. Curves were presented for COD, HAD, LEM, POL, and WTH. Comments made on knife-edge curves found for cod using stochastic simulation, apparently caused by data weakness. LMTP affects fish but not Nephrops.

Understanding the size selectivity of redfish (Sebastes spp.) in North Atlantic trawl codends

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Management Systems
Authors: Herrmann, B. (Intern), Sistiaga, M. (Ekstern), Nielsen, K. N. (Ekstern), Larsen, R. B. (Ekstern)
Pages: 1-13
Publication date: 2012
Main Research Area: Technical/natural sciences

Publication information
Design, udvikling og dokumentation af et selektivt trawl til demersalt fiskeri i Nordsøen

General information
State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources
Authors: Madsen, N. (Intern), Frandsen, R. (Intern), Herrmann, B. (Intern), Feekings, J. P. (Intern), Krag, L. A. (Intern)
Number of pages: 13
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Publication information
Place of publication: København
Publisher: Ministeriet for Fødevarer, Landbrug og Fiskeri
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Main Research Area: Technical/natural sciences

Bibliographical note
Finansieret af EU’s fiskerisektorprogram EFF og Fødevareministeriet
Source: orbit
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Development of a codend concept to improve size selectivity of Nephrops (Nephrops norvegicus) in a multi-species fishery

General information
State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources
Authors: Frandsen, R. (Intern), Herrmann, B. (Intern), Madsen, N. (Intern), Krag, L. A. (Intern)
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Web of Science (2018): Indexed yes
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Scopus rating (2017): CiteScore 1.94 SJR 0.941 SNIP 0.959
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BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.21 SJR 1.183 SNIP 1.153
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.092 SNIP 1.131 CiteScore 2.01
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.122 SNIP 1.305 CiteScore 2.17
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.049 SNIP 1.167 CiteScore 1.85
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.948 SNIP 1.189 CiteScore 1.78
ISI indexed (2012): ISI indexed yes
Effect of netting direction and number of meshes around on size selection in the codend for Baltic cod (Gadus morhua)

We investigated experimentally the effect that turning the netting direction 90° (T90) and halving the number of meshes around in the circumference in a diamond mesh codend had on size selection of Baltic cod. The results generally agreed with predictions of a previous simulation-based study. Both modifications had a significant positive effect on the size selection of cod. The best selection results were obtained for a codend in which both factors were applied together. For that codend, very little between-haul variation in cod size selection was detected, especially compared to the reference codend in which none of the modifications were applied.

General information
State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources, Johann Heinrich von Thünen-Institute, Sea Fisheries Institute
Authors: Wienbeck, H. (Ekstern), Herrmann, B. (Intern), Moderhak, W. (Ekstern), Stepputtis, D. (Ekstern)
Pages: 80-88
Publication date: 2011
Main Research Area: Technical/natural sciences

Publication information
Journal: Fisheries Research
Volume: 109
Influence of grid orientation and time of day on grid sorting in a small-meshed trawl fishery for Norway pout (Trisopterus esmarkii)

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Management Systems
Authors: Eigaard, O. R. (Intern), Herrmann, B. (Intern), Nielsen, J. R. (Intern)
Pages: 15-26
Publication date: 2011
Main Research Area: Technical/natural sciences

Publication information
Journal: Aquatic Living Resources
Volume: 25
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Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): SNIP 0.299 SJR 0.296 CiteScore 0.66
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.41 SJR 0.606 SNIP 0.728
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.755 SNIP 0.843 CiteScore 1.39
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.649 SNIP 0.892 CiteScore 1.25
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.556 SNIP 0.695 CiteScore 1.15
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.553 SNIP 0.586 CiteScore 1.19
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.633 SNIP 0.687 CiteScore 1.17
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.612 SNIP 0.564
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.486 SNIP 0.589
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.741 SNIP 0.664
Scopus rating (2007): SJR 0.66 SNIP 0.811
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.652 SNIP 0.997
In the past, experimental fishing with square mesh codends was conducted with the expectation that this would lead to a better defined size selection indicated by a smaller selection range (SR) of haddock (Melanogrammus aeglefinus) and other gadoid species compared to that provided by traditional diamond mesh codends. However, experimental results demonstrated considerable between-haul variations in the selection parameters (L50 and SR). It was speculated that these results could be linked to differences in morphology of individual haddock of the same length. In the present study we assessed which measures of haddock morphology are important for size selection through meshes. We quantified between-individual variation in morphology and used simulation techniques to estimate that this variation can account for less than 28% (range 15–28%) of the SR values found during experimental fishing. By including a realistic range of mesh openings when simulating the fishing process of a square mesh codend, we were able to explain most of the experimental results. Additionally, we used our method to better understand the seasonal variation in size selectivity reported in the literature and to predict the basic selective properties for haddock for other mesh shapes. Finally, we found that the conditions of our model, which describes mesh penetration for haddock based on assessment of morphology, is very similar to the conditions previously applied in the literature to study size selection of haddock in diamond mesh codends.
Udvikling og demonstration af en selektiv sorteringsrist til jomfruhummerfiskeriet

General information
State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources
Authors: Madsen, N. (Intern), Frandsen, R. (Intern), Feekings, J. P. (Intern), Krag, L. A. (Intern), Herrmann, B. (Intern)
Number of pages: 25
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Place of publication: Hirtshals
Publisher: DTU Aqua. Institut for Akvatiske Ressourcer
Original language: Danish
Main Research Area: Technical/natural sciences

Bibliographical note
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Understanding limits to cod and haddock separation using size selectivity in a multispecies trawl fishery: an application of FISHSELECT

General information
State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources
Authors: Sistiaga, M. (Ekstern), Herrmann, B. (Intern), Nielsen, K. N. (Ekstern), Larsen, R. B. (Ekstern)
Pages: 927-940
Publication date: 2011
Main Research Area: Technical/natural sciences

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Journal: Canadian Journal of Fisheries and Aquatic Sciences
Volume: 68
Issue number: 5
ISSN (Print): 0706-652X
Ratings:
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Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): SJR 1.329 SNIP 1.036 CiteScore 2.44
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 2.56 SJR 1.388 SNIP 1.185
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
A simulation-based attempt to quantify the morphological component of size selection of Nephrops norvegicus in trawl codends

The selectivity for Nephrops (Nephrops norvegicus) in trawl codends generally is poor and the lack of steepness of the selection curve results in high discard rates and/or loss of legal-sized catch. This poor codend selectivity often is attributed to the irregular shape of Nephrops, which to some extent characterizes the problem as insoluble. In the present study, the FISHSELECT methodology was used to examine the selection process of the species in order to identify ways to improve selectivity. The use of three different modes of orientation for contact (contact modes) with the codend meshes explained
most of the characteristics of the selection curves for Nephrops obtained experimentally. The contact mode with the
smallest cross-section was optimal for mesh penetration and, when evaluated against experimental data, 87.5% of all
Nephrops encountering the gear were estimated to meet the netting in this contact mode. The range of configurations of
the meshes (e.g., opening angles in the diamond mesh netting) was determinative for the selectivity, and the selective
process for Nephrops was found to take place along the entire length of the codend. Simulating selectivity in a diamond
mesh codend in which the closed meshes in the forward part of the codend were replaced by more open meshes revealed
that the selectivity for Nephrops can be efficiently improved. (C) 2009 Elsevier B.V. All rights reserved.

General information
State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources
Authors: Frandsen, R. (Intern), Herrmann, B. (Intern), Madsen, N. (Intern)
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Publication date: 2010
Main Research Area: Technical/natural sciences

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Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.94 SJR 0.941 SNIP 0.959
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.21 SJR 1.183 SNIP 1.153
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.092 SNIP 1.131 CiteScore 2.01
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.122 SNIP 1.305 CiteScore 2.17
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.049 SNIP 1.167 CiteScore 1.85
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.948 SNIP 1.189 CiteScore 1.78
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.162 SNIP 1.142 CiteScore 1.7
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.063 SNIP 1.107
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.994 SNIP 1.068
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 0.946 SNIP 1.136
Web of Science (2008): Indexed yes
Assessment of dual selection in grid based selectivity systems

Herein we propose a method to assess dual selection in grid based selectivity systems. This method takes into account the parameter “grid contact likelihood” (Cgrid), which can be interpreted as the proportion of fish that actually makes an attempt to escape through the grid. In a case study of the Barents Sea cod and haddock trawl fishery, we demonstrate that our model describes the experimental data better than the models previously used to fit similar data. For both cod and haddock, Cgrid was significantly smaller than 1.0, which demonstrated the relevance of the proposed model. Cgrid was higher for haddock than for cod, which might be due to behavioral differences between the species. The Cgrid values for both species suggest that the grid functions well, as on average more than 75% of the cod and more than 94% of the haddock were predicted to be able to attempt an escape through the grid. For both species the contact L50 for the grid (L50grid) was significantly higher than the L50 for the codend (L50codend). These values agree with the experimental observations that most of the escaping fish use the grid to escape, whereas only a few escape occurs through the codend. By parametric simulation and using the case study results as the baseline, we investigated and compared the precision of the selectivity parameters estimated with our model for two different experimental setups. The results show that except for some extreme situations, the data for such studies need to be collected with a three-compartment setup to avoid imprecise estimates of Cgrid, L50grid, SRgrid, L50codend, and SRcodend. In general, only the combined selectivity of the grid and the codend could be estimated with acceptable precision using a standard two-compartment sampling approach.

General information
State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources
Authors: Sistiaga, M. (Ekstern), Herrmann, B. (Intern), Grimaldo, E. (Ekstern), Larsen, R. B. (Ekstern)
Pages: 187-199
Publication date: 2010
Main Research Area: Technical/natural sciences

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BFI (2018): BFI-level 1
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<td>2007</td>
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<td>2003</td>
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<td>2002</td>
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<td>2000</td>
<td>SJR 0.565 SNIP 0.838</td>
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Original language: English
Trawl, Dual selection, Diamond mesh codend, Grid, Contact, SELNET, Haddock, Selectivity, Cod
DOIs: 10.1016/j.fishres.2010.05.006
Report of the Study Group on Turned 90° Codend Selectivity, focusing on Baltic Cod Selectivity (SGTCOD)

General information
State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources
Number of pages: 19
Publication date: 2010

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Original language: English
Series: ICES CM 2010
Number: FTC:05
Main Research Area: Technical/natural sciences
Electronic versions:
SGTCOD10.doc
Source: orbit
Source-ID: 276917
Publication: Research › Report – Annual report year: 2011

Bruger vi de mest optimale maskøfaconer og størrelser i dansk fiskeri?

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Herrmann, B. (Intern), Krag, L. A. (Intern), Madsen, N. (Intern), Frandsen, R. (Intern), Lundgren, B. (Intern)
Publication date: 2009
Main Research Area: Technical/natural sciences
Electronic versions:
FISHSELECT_DanFish.pdf
Source: orbit
Source-ID: 251365
Publication: Research › Poster – Annual report year: 2009

Can codend selectivity of Nephrops be explained by morphology?
Selectivity of Nephrops in trawl codends is in general poor with resulting high discard rates and / or loss of legal sized catch. In the present study, the FISHSELECT methodology has been used to attain a profound understanding of the selection process of the species in order to identify means to improve the selectivity. It was found the size selection of Nephrops in trawl codends can be explained by combining contributions resulting contacts with the meshes for three different modes of orientations of the Nephrops.

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Frandsen, R. (Intern), Herrmann, B. (Intern), Madsen, N. (Intern)
Publication date: 2009
Event: Poster session presented at ICES Working Group on Fishing Technology and Fish Behaviour (WGFTFB), Ancona, Italy.
Main Research Area: Technical/natural sciences
Electronic versions:
FTFB_FishSelect_NEP.ppt
Source: orbit
Source-ID: 243591
Publication: Research › Poster – Annual report year: 2009
Investigation of the paired-gear method in selectivity studies

We estimated selectivity parameters using simultaneously the paired-gear and covered codend method for two fish species and four different selection systems, for a total of eight study cases. The deviation (Δ) in L50 and SR between these sampling methods observed in a former simulation study was repeated throughout the eight cases in this investigation. When using the paired-gear method, the distribution of the estimated L50 and SR is wider; the distribution of the estimated split parameter has a higher variability than the true split; the estimated mean L50 and SR can be biased; the estimated between-haul variation is different from that estimated by the covered codend. ΔL50 and ΔSR decrease when the number of fish in the codend increases, but they do not necessarily progress towards zero. ΔL50 and ΔSR are positively correlated with the deviation between the split and the true split. We recommend that the methodology used to obtain selectivity estimates using the paired-gear method be reviewed.
Kullertrawl fanger færre torsk

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Krag, L. A. (Intern), Madsen, N. (Intern), Frandsen, R. (Intern), Holst, R. (Intern), Herrmann, B. (Intern), Hansen, K. (Ekstern)
Pages: 15
Publication date: 2009

Publication information
Pages (from-to): 15
Newspaper: Fiskeritidende
Volume: 16
No.: 3
Ratings:
ISI indexed (2013): ISI indexed no
Modelling axisymmetric cod-ends made of different mesh types

Cod-ends are the rearmost part of trawl fishing gears. They collect the catch, and for many important species it is where fish selection takes place. Generally speaking they are axisymmetric, and their shape is influenced by the catch volume, the mesh shape, and the material characteristics. The shape of cod-ends is of importance as it determines mesh opening and consequently influences the selectivity of fish from the cod-end. Selectivity is the process whereby a gear retains large fish and releases small ones. In recent years, as many fish stocks have become more threatened, understanding the selectivity process has become more important. This paper presents a model of the deformation of an axisymmetric cod-end. The twine tension and the catch pressure acting on the knots of each mesh along the cod-end profile are calculated, and a Newton-Raphson scheme is used to estimate the equilibrium position of the netting. The software package developed to solve this problem is freely available. Comparisons are carried out with a previous model and experimental data.
Modelling escapement during the fishing process as a dual sequence - Introducing SELNET

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Herrmann, B. (Intern), Madsen, N. (Intern), Sistiaga, M. (Ekstern), Grimaldo, E. (Ekstern)
Publication date: 2009
Event: Poster session presented at ICES Working Group on Fishing Technology and Fish Behaviour (WGFTFB), Ancona, Italy.
Main Research Area: Technical/natural sciences
Electronic versions:
SELNET_Surface.ppt
Modelling escapement during the fishing process as a dual sequence.doc

Bibliographical note
Poster presentation with abstract
Source: orbit
Source-ID: 243589
Publication: Research › Poster – Annual report year: 2009

New approaches to selectivity studies in the Barents Sea

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Sistiaga, M. (Ekstern), Herrmann, B. (Intern), Nielsen, K. (Ekstern), Larsen, R. B. (Ekstern)
Publication date: 2009
Event: Poster session presented at ICES Working Group on Fishing Technology and Fish Behaviour (WGFTFB), Ancona, Italy.
Main Research Area: Technical/natural sciences
Electronic versions:
Fishselect poster abstract.doc
FISHSELECT_MANU_Final Poster.ppt
Source: orbit
Source-ID: 243593
Publication: Research › Poster – Annual report year: 2009

Prediction of selectivity from morphological conditions: Methodology and a case study on cod (Gadus morhua)
The FISHSELECT methodology, tools, and software were developed and used to measure the morphological parameters that determine the ability of cod to penetrate different mesh types, sizes, and openings. The shape of one cross-section at the cod's head was found to explain 97.6% of the mesh penetration results obtained in a laboratory experiment. Design guides predicting the 50% retention length (L50) of different mesh types, sizes, and openings were produced and compared with results from sea trials. Results show that the morphology-based simulations can be used to explain both
the within-haul and the between-haul variations previously reported from sea trials. Finally, based on the results obtained, ideas to improve the size selection of cod in towed gear are presented.
Relevance of dual selection in grid based selectivity studies

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Herrmann, B. (Intern), Sistiaga, M. (Ekstern), Grimaldo, E. (Ekstern), Larsen, R. B. (Ekstern)
Publication date: 2009
Event: Poster session presented at ICES Working Group on Fishing Technology and Fish Behaviour (WGFTFB), Ancona, Italy.
Main Research Area: Technical/natural sciences
Electronic versions:
Dual selection poster abstract.doc
Poster Dual final.ppt
Source-ID: 233374
Publication: Research - peer-review › Journal article – Annual report year: 2009

Report of the Study Group on Turned 90° Codend Selectivity, focusing on Baltic Cod Selectivity (SGTCOD)

General information
State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources
Authors: Herrmann, B. (Intern), Moderhak, W. (Ekstern), Wienbeck, H. (Ekstern), Valentinson, D. (Ekstern), Priour, D. (Ekstern), Sala, F. A. (Ekstern)
Number of pages: 23
Publication date: 2009

Publication information
Place of publication: Copenhagen
Publisher: International Council for the Exploration of the Sea
Original language: English
Series: ICES CM
Number: FTC:05
Main Research Area: Technical/natural sciences
Source-ID: 277992
Publication: Research › Report – Annual report year: 2009
A user-guide to the FISHSELECT software tool

General information
State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources
Authors: Herrmann, B. (Intern)
Number of pages: 34
Publication date: 2008

Publication information
Place of publication: Hirtshals
Publisher: DTU Aqua. Institut for Akvatiske Ressourcer
Original language: English
Main Research Area: Technical/natural sciences
Electronic versions:
A user-guide to the FISHSELECT SOFTWARE TOOL.pdf
Source: orbit
Source-ID: 259205
Publication: Research › Report – Annual report year: 2008

Comparison of selective properties for nettings when used in normal direction versus in 90 degrees turned direction

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Herrmann, B. (Intern), Krag, L. A. (Intern), Madsen, N. (Intern)
Publication date: 2008
Event: Poster session presented at ICES Working Group on Fishing Technology and Fish Behaviour (WGFTFB), Tórshavn, Faroe Islands.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 232407
Publication: Research › Poster – Annual report year: 2008

Simulation-based study of precision and accuracy for methods to assess size selective properties of codends

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Herrmann, B. (Intern)
Publication date: 2008
Event: Poster session presented at ICES Working Group on Fishing Technology and Fish Behaviour (WGFTFB), Tórshavn, Faroe Islands.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 232408
Publication: Research › Poster – Annual report year: 2008

Simulering af selektivitet i fiskeredskaber

General information
State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources, Section for Monitoring
Authors: Herrmann, B. (Intern), Krag, L. A. (Intern), Frandsen, R. (Intern), Lundgren, B. (Intern), Madsen, N. (Intern), Stæhr, K. (Intern)
Publication date: 2008

Publication information
Place of publication: Charlottenlund
Publisher: DTU Aqua. Institut for Akvatiske Ressourcer
Original language: Danish
Main Research Area: Technical/natural sciences
Electronic versions:
Rapport - Simulering af selektivitet i fiskeredskaber1.pdf
FISHSELECT - Study of cod (Gadus morhua)

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Krag, L. A. (Intern), Herrmann, B. (Intern), Frandsen, R. (Intern), Staehr, K. (Intern), Madsen, N. (Intern), Lundgren, B. (Intern)
Publication date: 2007
Event: Poster session presented at Presented at ICES/FAO Working Group on Fishing Technology and Fish Behaviour (WGFTFB), Dublin, April, Dublin.
Main Research Area: Technical/natural sciences

Bibliographical note
Poster
Source: orbit
Source-ID: 225733
Publication: Research › Poster – Annual report year: 2007

FISHSELECT - Study of plaice (Pleuronectes platessa)

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Frandsen, R. (Intern), Herrmann, B. (Intern), Krag, L. A. (Intern), Staehr, K. (Intern), Lundgren, B. (Intern), Madsen, N. (Intern)
Publication date: 2007
Event: Poster session presented at Presented at ICES/FAO Working Group on Fishing Technology and Fish Behaviour (WGFTFB), Dublin, April, Dublin.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226299
Publication: Research › Poster – Annual report year: 2007

Main factors affecting cod end selectivity

General information
State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources
Authors: O’Neill, B. (Ekstern), Sala, A. (Ekstern), Petrakis, G. (Ekstern), Priour, D. (Ekstern), Ozbilgin, H. (Ekstern), Herrmann, B. (Intern), Cheilari, A. (Ekstern), Lucchetti, A. (Ekstern), Sacchi, J. (Ekstern), Breen, M. (Ekstern), Theret, F. (Ekstern)
Number of pages: 55
Publication date: 2007

Publication information
Original language: English
Main Research Area: Technical/natural sciences
Links:
Source: orbit
Source-ID: 259202
Publication: Research › Report – Annual report year: 2007

Modelling axi-symmetrical cod-ends made of different mesh types

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Priour, D. (Ekstern), Herrmann, B. (Intern), O’Neill, B. (Ekstern)
PRESEMO - a predictive model of codend selectivity - a tool for fishery managers

The codend selectivity simulation model PRESEMO is a predictive model based on an understanding of the physical, biological, and behavioural mechanisms that underpin codend selection. In this paper, PRESEMO is used to predict the selectivity of a large range of codends of varying design. In particular, the selectivity of codends with mesh sizes in the range 80-160 mm, number of meshes around in the range 60-140, and netting twine thickness in the range 3-6 mm are predicted and, where possible, the predictions are validated with experimental data. Using the simulated data, the codend selectivity parameters are expressed in terms of the gear design parameters and in terms of both catch size and gear design parameters. The potential use of these results in a management context and for the development of more selective gears is highlighted by plotting iso-/(50) and iso-sr curves used to identify gear design parameters that give equal estimates of the 50% retention length and the selection range, respectively. It is emphasized that this approach can be extended to consider the influence of other design parameters and, if sufficient relevant quantitative information exists, biological and behavioural parameters. As such, the model presented here will provide a better understanding of the selection process, permit a more targeted approach to codend selectivity experiments, and assist fishery managers to assess the impact of proposed technical measures that are introduced to reduce the catch of undersized fish and unwanted bycatch.

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: O’Neill, F. (Ekstern), Herrmann, B. (Intern)
Pages: 1558-1568
Publication date: 2007
Main Research Area: Technical/natural sciences

Publication information
Journal: ICES Journal of Marine Science
Volume: 64
Issue number: 8
ISSN (Print): 1054-3139
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 2.98
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.63
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 2.18
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.62
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.46
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.35
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
In this paper, the paired-gear and covered cod-end methods for estimating the selectivity of trawl cod-ends are compared. A modified version of the cod-end selectivity simulator PRESEMO is used to simulate the data that would be collected from a paired-gear experiment where the test cod-end also had a small mesh cover. Thus, estimates of the selectivity parameters of the test cod-end can be made using both the paired-gear method and the covered cod-end method. These estimates are compared and, as it is assumed that the covered cod-end method is objective, we conclude that the paired-gear method is biased. We demonstrate that extreme parameter estimates as well as discrepancies between the paired-gear and covered cod-end experiments do not necessarily reflect physical or biological mechanisms. We believe that this phenomenon may help explain cases in the literature where the covered cod-end and paired-gear methods produce different estimates of cod-end selectivity.
Main Research Area: Technical/natural sciences

Publication information
Journal: Fisheries Research
Volume: 83
Issue number: 2-3
ISSN (Print): 0165-7836
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.94 SJR 0.941 SNIP 0.959
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.21 SJR 1.183 SNIP 1.153
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.092 SNIP 1.131 CiteScore 2.01
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.122 SNIP 1.305 CiteScore 2.17
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.049 SNIP 1.167 CiteScore 1.85
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.948 SNIP 1.189 CiteScore 1.78
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.162 SNIP 1.142 CiteScore 1.7
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.063 SNIP 1.107
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.994 SNIP 1.068
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 0.946 SNIP 1.136
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.031 SNIP 1.079
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.028 SNIP 1.274
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.924 SNIP 1.139
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 0.964 SNIP 1.032
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 1.078 SNIP 1.29
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 1.19 SNIP 1.246
Web of Science (2002): Indexed yes
Simulation-based study of the combined effect on cod-end size selection of turning meshes by 90 degrees and reducing the number of meshes in the circumference for round fish

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Herrmann, B. (Intern), Priour, D. (Ekstern), Krag, L. A. (Intern)
Pages: 222-232
Publication date: 2007
Main Research Area: Technical/natural sciences

Publication information
Journal: Fisheries Research
Volume: 84
Issue number: 2
ISSN (Print): 0165-7836
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.94 SJR 0.941 SNIP 0.959
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.21 SJR 1.183 SNIP 1.153
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.092 SNIP 1.131 CiteScore 2.01
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.122 SNIP 1.305 CiteScore 2.17
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.049 SNIP 1.167 CiteScore 1.85
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.948 SNIP 1.189 CiteScore 1.78
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.162 SNIP 1.142 CiteScore 1.7
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.063 SNIP 1.107
Slutrapport TEMAS (Technical measures - development of evaluation model and application in danish fisheries)

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Management Systems, Section for Fisheries- and Monitoring Technology
Number of pages: 31
Publication date: 2007

Publication information
Publisher: [s.n.]
Original language: Danish
Main Research Area: Technical/natural sciences

Bibliographical note
Rapport til Ministeriet for Fødevarer, Landbrug og Fiskeri
Source: orbit
Source-ID: 227493
Publication: Research › Report – Annual report year: 2007

Assessment of reliability of results obtained from surveys using trawl gears

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Experimental and theoretical study of red mullet (Mullus barbatus) selection in codends of Mediterranean bottom trawls

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Sala, A. (Ekstern), Priour, D. (Ekstern), Herrmann, B. (Intern)
Pages: 317-327
Publication date: 2006
Main Research Area: Technical/natural sciences

Publication information
Journal: Aquatic Living Resources
Volume: 19
Issue number: 4
ISSN (Print): 0990-7440
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): SNIP 0.299 SJR 0.296 CiteScore 0.66
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.41 SJR 0.606 SNIP 0.728
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.755 SNIP 0.843 CiteScore 1.39
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.649 SNIP 0.892 CiteScore 1.25
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.556 SNIP 0.695 CiteScore 1.15
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.553 SNIP 0.586 CiteScore 1.19
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.633 SNIP 0.687 CiteScore 1.17
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.612 SNIP 0.564
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.486 SNIP 0.589
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.741 SNIP 0.664
Scopus rating (2007): SJR 0.66 SNIP 0.811
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.652 SNIP 0.997
Web of Science (2006): Indexed yes
Investigation of the paired gear method

General information

State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Frandsen, R. (Intern), Herrmann, B. (Intern), Holst, R. (Intern)
Publication date: 2006
Event: Poster session presented at ICES Symposium on Fishing Technology and Fish Behaviour (WGFTFB), Izmir, April,
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 225448
Publication: Research › Poster – Annual report year: 2006

Modelling the effect of interaction between fish morphology and mesh shapes on discard levels in mixed fisheries

General information

State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources, Section for Management Systems
Authors: Lundgren, B. (Intern), Herrmann, B. (Intern), Krag, L. A. (Intern), Frandsen, R. (Intern), Madsen, N. (Intern), Stæhr, K. (Intern), Eigaard, O. R. (Intern)
Publication date: 2006
Event: Poster session presented at Fishing technology in the 21. century, Boston, MA,
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 238723
Publication: Research › Poster – Annual report year: 2006

Prediction of size selectivity in trawl codends by simulation

General information

State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources
Authors: Herrmann, B. (Intern)
Number of pages: 32
Publication date: 2006

Publication information

Place of publication: Hirtshals
Publisher: Danish Institute for Fisheries Research
Original language: English
Main Research Area: Technical/natural sciences
Electronic versions:
Prediction of size selectivity in trawl codends by simulation.pdf
PREMECS-II: Development of predictive model of cod-end selectivity

General information
State: Published
Organisations: Section for Management Systems, National Institute of Aquatic Resources
Authors: Priour, D. (Ekstern), O’Neill, F. (Ekstern), Sala, A. (Ekstern), Chevalier, P. (Ekstern), Herrmann, B. (Intern)
Number of pages: 265
Publication date: 2006

Publication information
Original language: English
Main Research Area: Technical/natural sciences
Links:

Bibliographical note
Contract n° Q5RS-2002-01328

Simulation of catch and discard for a fishing gear - demonstrating the PRESEMO software

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Herrmann, B. (Intern), Madsen, N. (Intern), Krag, L. A. (Intern), Frandsen, R. (Intern), Lundgren, B. (Intern), Priour, D. (Ekstern), O’Neill, B. (Ekstern)
Publication date: 2006
Event: Poster session presented at Fishing technology in the 21st century, Boston, MA, United States.
Main Research Area: Technical/natural sciences

Bibliographical note
ICES BOS06 2:066P

Simulation of cod-end deformation - demonstrating the FEMNET software

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Priour, D. (Ekstern), Herrmann, B. (Intern)
Publication date: 2006
Event: Poster session presented at Fishing technology in the 21st century, Boston, MA, United States.
Main Research Area: Technical/natural sciences

Theoretical study of the effect of round straps on the selectivity in a diamond mesh cod-end

FEMNET, a numerical tool based on the finite element method, was applied to estimate the shapes of various diamond-mesh cod-end designs during fishing. The only design differences rest in the use of round straps of different lengths, positions and numbers. The cod-end shape estimates were then entered in the selectivity simulation tool PRESEMO to simulate the selectivity processes of the various cod-end designs under the same varying fishing conditions. This enabled us to demonstrate how one or two round straps along the cod-end axis may change the selectivity of the cod-end compared with a reference cod-end, without round straps. We predict that in cod-end designs, which comply with the EU legislation, the 50% retention length (L50) may be reduced by up to 1.5 cm (5%) for haddock.
Theoretical study of the influence of twine thickness on haddock selectivity in diamond mesh cod-ends

Using the cod-end simulation model PRESEMO, the influence of twine thickness on cod-end selectivity is investigated. The reduction of lateral mesh opening that arises as a result of both twine bending stiffness and the physical presence of the twine is considered. While it is shown that this leads to a reduction in cod-end selectivity with an increase of twine thickness, it does not fully explain the relationship found in the available experimental data. The effect twine thickness may have on the ability of a fish to deform a mesh during the early part of a haul and how netting made of thicker twine may discourage a fish from making escape attempts is investigated. The influence that these factors may have is examined and when included in PRESEMO the resulting simulations are a much better representation of the experimental data.

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Herrmann, B. (Intern), O'Neill, F. (Ekstern)
Pages: 221-229
Publication date: 2006
Main Research Area: Technical/natural sciences

Publication information
Journal: Fisheries Research
Volume: 80
Issue number: 2-3
ISSN (Print): 0165-7836
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.94 SJR 0.941 SNIP 0.959
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.21 SJR 1.183 SNIP 1.153
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.092 SNIP 1.131 CiteScore 2.01
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.122 SNIP 1.305 CiteScore 2.17
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.049 SNIP 1.167 CiteScore 1.85
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
Catch shape in codend (DEMAT05)

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Priour, D. (Ekstern), Herrmann, B. (Intern)
Pages: 41-58
Publication date: 2005

Host publication information
Title of host publication: Proceedings of the 7th international workshop on methods for the development and evaluation of maritime technologies
ISBN (Print): 89-89382-22-X
Series: Berichte aus dem Maschinenbau
ISSN: 0945-0874
Effect of catch size and shape on the selectivity of diamond mesh cod-ends: II. Theoretical study of haddock selection

A series of computer simulations were carried out to predict how the selectivity of haddock in a diamond mesh cod-end varies according to total catch, by-catch, entry time of by-catch and the shape of the catch build-up in the cod-end. Results were compared to those from sea trials. I also investigated the predicted selectivity on the assumption that the shape of the cod-end does not change as the catch accumulates. The latter investigations were carried out for various shapes of the cod-end. The simulations indicated that the 50% retention length (L50) increases with both the total catch and the by-catch weight. They also indicated that the entry time of the by-catch may have an important influence on both the 50% retention length and selection range (SR). The shape of the catch in the cod-end had a similar effect, for the cases analyzed. Different cod-end shapes showed very large differences in the values for L50 as well as more narrow SRs, assuming that the shape of the cod-end remained constant during the tow. The simulations strongly indicate that the change of shape of the diamond mesh cod-end as the catch builds up during towing is a major contribution to the SR.
Effect of catch size and shape on the selectivity of diamond mesh cod-ends: I. Model development

An individual-based model that simulates fish selection processes in diamond mesh cod-ends of towed fishing gears is outlined. The model is implemented in a computer program called PRESEMO. A typical simulation can be carried out within a few minutes on a personal computer. Up to four different populations of fish entering the cod-end during a tow can be accounted for. Each fish is assigned a weight, girth, width and height according to its length, and is assumed to have an elliptical cross-section. Fish are allocated a period of travel time down the cod-end, a period for swimming in the cod-end without being exhausted, a period between escape attempts and a packing density for those swimming ahead of the catch. An escape attempt is deemed successful if a fish can pass through the mesh opening at the position in the cod-end where the escape attempt takes place. The mesh opening value is obtained from information on the shape of the cod-end, which depends on the catch weight. The cod-end shape is updated dynamically as the catch builds up during the tow. During a simulation the selection process is continually visualized, that is, the entry, movement and escape attempts of individual fish are shown as well as the changes in the cod-end geometry. At the end of a simulation, a logistic function is automatically fitted to the selection data to obtain estimates of the 50% retention length and the selection range.

General information
State: Published
Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Herrmann, B. (Intern)
Pages: 1-13
Publication date: 2005
Main Research Area: Technical/natural sciences

Publication information
Journal: Fisheries Research
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Modelling and simulation of size selectivity in diamond mesh trawl cod-ends

Within many fisheries there is a widespread discard of fish. Furthermore, there are several fisheries where fish are caught before reaching the optimal size, leading to an adverse exploitation of the resources. One way to achieve a more optimal exploitation is to improve the size selectivity of the fishing gear. The cod-end is the rearmost part of a trawl where catch accumulates and in which most of the size selection is known to take place. To date, the main method used to assess the selectivity of trawl cod-ends has been to run sea trials followed by statistical analysis of the obtained experimental data. The objective of this thesis has been to describe an alternative assessment method that uses an individual-based structural model of the selection process in the cod-end and computer simulations.

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Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
Authors: Herrmann, B. (Intern)
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Theoretical study of the between-haul variation of haddock selectivity in a diamond mesh cod-end

General information
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Organisations: Section for Fisheries- and Monitoring Technology, National Institute of Aquatic Resources
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The pelagic trawlers involved in the Antarctic krill harvest apply different trawl systems and fishing gear. There were many unknown parameters on which to estimate the catch efficiency of the different trawls that were used.

The aim of the project was to establish morphology based description of the selection process of Antarctic krill in towed fishing gear (FISHSELECT). This knowledge lead to optimizations of trawl designs in the krill fishery and was used to quantify the consequences in terms of catch efficiency, potential escape mortality and catch loss of using different gear designs of different population structures. Such information is valuable both for managers and the industry exploiting the resource. We performed a study including morphology based mathematical modeling (FISHSELECT) of different krill sex
and maturity groups, from data acquired through AKES (Antarctic Krill and Ecosystem Studies). The FISHSELECT method has previously been used to describe and predict size selection of fish and crustaceans. The methodology was used to describe and predict size selection of krill in trawl gear. The model was used to predict basic selective characteristics of different netting designs. The results from these calculations were used to quantify the theoretic catch efficiency and escape mortality in different nets and to construct a net configuration with optimal mesh size and shape in order to minimize escape mortality. Finally, we constructed design guides, which described the basis selective properties for krill in different mesh shapes and sizes.

This project was coordinated by DTU Aqua.

The project was funded by the Research Council of Norway.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Institute of Marine Research
Aker BioMarine ASA
Olympic A/S
Period: 01/01/2012 → 31/12/2014
Number of participants: 2
Research area: Fisheries Technology
Project participant:
Herrmann, Bent (Intern)

Project Manager, academic:
Krag, Ludvig Ahm (Intern)

Design optimization of SELTRA 180 (38908)
After implementation, the industry was concerned that a newly developed selective codend (SELTRA codend) was causing relative large losses of the economically important Nephrops. The aim of the project was to optimize the geometry of a 2-panel and 4-panel version of the SELTRA codend through extensive monitoring of their global geometry in the flume tank in Hirtshals. The global geometry was monitored with optic stereo-system techniques over a gradient of catch weights. The final design was demonstrated in the flume tank for the industry for further discussion. The project delivered detailed design specifications for the Nephrops fishery in Kattegat. Further, the test conducted in the project delivered a detailed understanding of the effect of changing design parameters like panel construction, selvegedes, codend construction (number of panels, meshes in circumference, tension lines during the catch build-up).

The changes in the design is today implemented in the technical legislation in the Kattegat and Skagerrak and there were no problems or difficulties raised by the industry during the commercial take-up process.

The project was coordinated by DTU Aqua.

The project was funded by the Danish Ministry of Food, Agriculture and Fisheries and the European Fisheries Fund (EFF).

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Danish Fishermen's Association
Period: 01/01/2011 → 31/12/2012
Number of participants: 5
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Project participant:
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Madsen, Niels (Intern)
Frandsen, Rikke (Intern)
Lundgren, Bo (Intern)

Project Manager, academic:
Krag, Ludvig Ahm (Intern)
**Documentation of the selective effect of SELTRA 180 in Kattegat (38917)**

The cod stock in Kattegat was at a critical low level. A selective SELTRA codend concept was developed to reduce the fishing mortality of cod in the Nephrops directed fishery in Kattegat. A version of the SELTRA design, SELTRA 180 was developed directly for the Kattegat situation and optimized through flume tank tests. The aim of the project was to document the selective effect of SELTRA 180 codend, which was made mandatory in Kattegat in 2011, and to compare it with the standard 90 mm gear used in Kattegat. The SELTRA design was developed to get an efficient selection of cod while retaining Nephrops. Results from an increased commercial onboard monitoring of the catch composition obtained with the SELTRA codends were compared with results obtained from experimental fishing.

The project demonstrated that the 90mm codend with a SELTRA escape panel obtained similar selectivity for cod as a 120 mm standard codend. This documentation led to the implementation of the SELTRA codend in Skagerrak in 2011.

The project was coordinated by DTU Aqua.

This project was funded by the Danish Ministry of Food, Agriculture and Fisheries and the European Fisheries Fund (EFF).

**National Institute of Aquatic Resources**

Section for Ecosystem based Marine Management

Danish Fishermen's Association
Period: 01/01/2011 → 31/12/2012
Number of participants: 2
Research area: Fisheries Technology
Project participant:
Herrmann, Bent (Intern)

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Krag, Ludvig Ahm (Intern)

**Improving the selectivity for cod in Danish trawl fisheries (38887)**

The aim of the project was to develop and test more selective fishing gear for three major Danish fisheries:
- The demersal trawl fishery in the North Sea (120 mm)
- The demersal trawl fishery in Kattegat and Skagerrak (90 mm)
- Improve the selection range (SR) in the BACOMA codend used in the Baltic Sea

The new and more selective fishing gears were developed under consideration of the economy in the fishery. The project delivered three new selective gear solutions of which two were tested during experimental fishery. Technical descriptions of the new designs were delivered. Furthermore, an economical model to quantify the economic consequences of using the new selective fishing gears compared to existing standards was developed.

Experiments were conducted in the Baltic Sea cod fishery demonstrating that the selection range (SR) could be reduced by using a larger diamond mesh in the lower sheet of the BACOMA design. Further the project demonstrated the efficiency of legal selective escape panels in Skagerrak/Kattegat and the effect of varying design parameters in both the panel section and the trawl body. Finally the project demonstrated that active stimulating fish behavior around selective escape panels significantly can improve the escape panels’ selectivity.

The project was coordinated by DTU Aqua.

The project was funded by the Danish Ministry of Food, Agriculture, and Fisheries and the European Fisheries Fund (EFF).

**National Institute of Aquatic Resources**

Section for Ecosystem based Marine Management

Johann Heinrich von Thünen-Institute

Danish Fishermen's Association
Period: 01/01/2010 → 31/12/2012
Number of participants: 4
Research area: Fisheries Technology
Project participant:
Karlsen, Junita Diana (Intern)
Feekings, Jordan P. (Intern)

Project Manager, academic:
Krag, Ludvig Ahm (Intern)
Herrmann, Bent (Intern)
Test and demonstration of a selective topless trawl in the North Sea (38699-2)
The aim of the project was to develop and test a selective topless trawl to improve selectivity of cod in the demersal mixed species fishery in the northern North Sea.

The design idea was based on utilizing behavioral differences between the species, specifically that most fish stay low in the trawl, and that gadoids, like cod, raise further aft in the tapered section of the gear and can escape above the cut-back headline. An improved species selectivity of cod in the North Sea can allow and economically feasible mixed fishery without further exhausting the cod stocks.

In addition to the topless design, a SELTRA sorting box was installed in codend to compare the selective effect between a relatively large design modification in the forward part of the trawl with a relative small change in codend where the behavioral differences between species is less expressed.

The project is coordinated by DTU Aqua.

The project was funded by the Danish Ministry of Food, Agriculture and Fisheries and the European Fisheries Fund (EFF).

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Danish Fishermen's Association
Cosmos Trawl A/S
Johann Heinrich von Thünen-Institute
Period: 01/01/2009 → 31/12/2011
Number of participants: 3
Research area: Fisheries Technology
Project participant:
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Development of fisheries with minimized emission of greenhouse gases (38686)
Identification of methods and prioritization of areas for actions of minimizing greenhouse gas emissions, optimizing fuel consumption and, thus, improve the economy and reducing the environmental effects of fishing on marine habitats. The focus is on fishing with trawls. Two different strategies (work packages) are considered in the project:

1) Development of new and more energy efficient trawls: This work package targets the development of trawl design with improved relationship between capture efficiency and/or catch value in relation to energy use for towing the gear. In this work package we apply an internationally developed computational model based on fluid mechanics and finite element methods and models to predict the capture efficiency of trawl. Through computer simulations we investigate the predicted ratio between catch value and fuel consumption for different trawl designs. These simulations are accordingly applied to identify the most favorable trawl design with optimized value of the catch in relation to the fuel consumption to tow the trawl. Through international cooperation, we also experimentally examine the consequences on catch efficiency of applying high strength thin twine netting with low drag in sections of trawls.

2) Fisheries tactics and management in relation to energy efficiency in fisheries effort allocation for different fisheries: This work package analyze management options for different types of fisheries, to investigate opportunities and incentives to achieve the same value (and catch) in fisheries with less effort or re-allocation of effort and consequently less fuel consumption. Advanced computer based bio-economic fisheries simulation models are developed and used in fleet and stock-based scenario analyses for energy efficiency in fishery by integrated evaluation of fishing effort, catch, catch composition and utilization, economics, and fuel consumption under given effort allocation schemes. This involves development and implementation of a generic bio-economic Individual Based Model (IBM) that works on individual vessel basis and which can simulate multi-stock-multi-fleet (mixed) fisheries and evaluate on a scale of very high resolution in time and space. This computer based management evaluation tool and simulation model can evaluate economic cost-benefits, biological impacts according to fish stock sustainability, as well energy efficiency according to catch in weight and value per fuel volume consumed and/or in relation to total fuel costs for different management scenarios. The implementation of the IBM model involves additionally development of advanced statistical and computer based models and methods for coupling information from logbook databases with information from VMS tracking (satellite monitoring) databases on vessel and fishing trip basis. Furthermore, it involves development of a web-based questionnaire and platform to obtain information from the Danish fishery on cost dynamics with focus on fuel costs and effort allocation.
Management plans and Danish fishery (2245)
The objectives of the project were with reference to the EU Commissions proposals on multi-annual management plans, to deliver high quality advice on management of the fishing effort in Danish fisheries in the Baltic Sea, the North Sea, the Skagerrak and the Kattegat.

To be able to deliver the advice the project addressed the need for detailed and accurate data on catches, effort and economical performance in the main demersal Danish fisheries in the concerned areas and the need for accurate stock assessment of the economically most important fish and shellfish stocks. The project also developed a systematic method to give a qualified prediction of the selectivity of a trawl based on information on the trawl design.

The project included seven work packages: (i) Description of development in catches, fishing effort and economical performance in the main demersal Danish fisheries including creation of a single database; (ii) Develop a reference fleet system to collect detailed information on catches and fishing effort; (iii) Development of a software to be used to simulate trawl selectivity; (iv) Establish a fisheries independent monitoring survey on Norway lobster in the Skagerrak and the Kattegat; (v) Provide advice on a fishing effort management system for the demersal fisheries in Kattegat including proposal for enhancement of the cod selectivity in trawl fisheries; (vi) Provide advice on fishing effort in form of days at sea by métier; and (vii) Evaluate the impact of the effort management system in the Baltic Sea on the Danish fishery and the stocks.

The project was coordinated by DTU Aqua.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
University of Copenhagen
Period: 01/01/2006 → 31/12/2008
Number of participants: 13
Research areas: Fisheries Management & Fisheries Technology
Project participant:
Munch-Petersen, Sten (Intern)
Madsen, Niels (Intern)
Bastardie, Francois (Intern)
Pedersen, Eva Maria (Intern)
Christensen, Steen (Ekstern)
Project Manager, academic:
Kirkegaard, Eskild (Intern)
Andersen, Bo Sølgaard (Intern)
Activities:

**ICES - Study Group on Turned 90° Codend Selectivity, focusing on Baltic Cod Selectivity - SGTCOD**

*External organisation*

*Period: 2012 → …*

Bent Herrmann (Participant)

National Institute of Aquatic Resources

Section for Management Systems

Degree of recognition: International

**Related external organisation**

**ICES - Study Group on Turned 90° Codend Selectivity, focusing on Baltic Cod Selectivity - SGTCOD**

Activity: Membership › Membership of committees, commissions, boards, councils, associations, organisations, or similar