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Unspecified

*Publication date:*  
2018

*Document Version*  
Other version

[Link to publication from Aalborg University](#)

### *Citation for published version (APA):*

Andersen, R. E., Molbo, K., Jensen, T. H., Kucheryavskiy, S. V., Møller, P. R., Rathje, I. W., & Madsen, N. (2018). *A study of discard survival in set-net fisheries*. 1. Poster presented at ICES-FAO WGFTB 2018 meeting, Hirtshals, Denmark.

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# A study of discard survival in set-net fisheries



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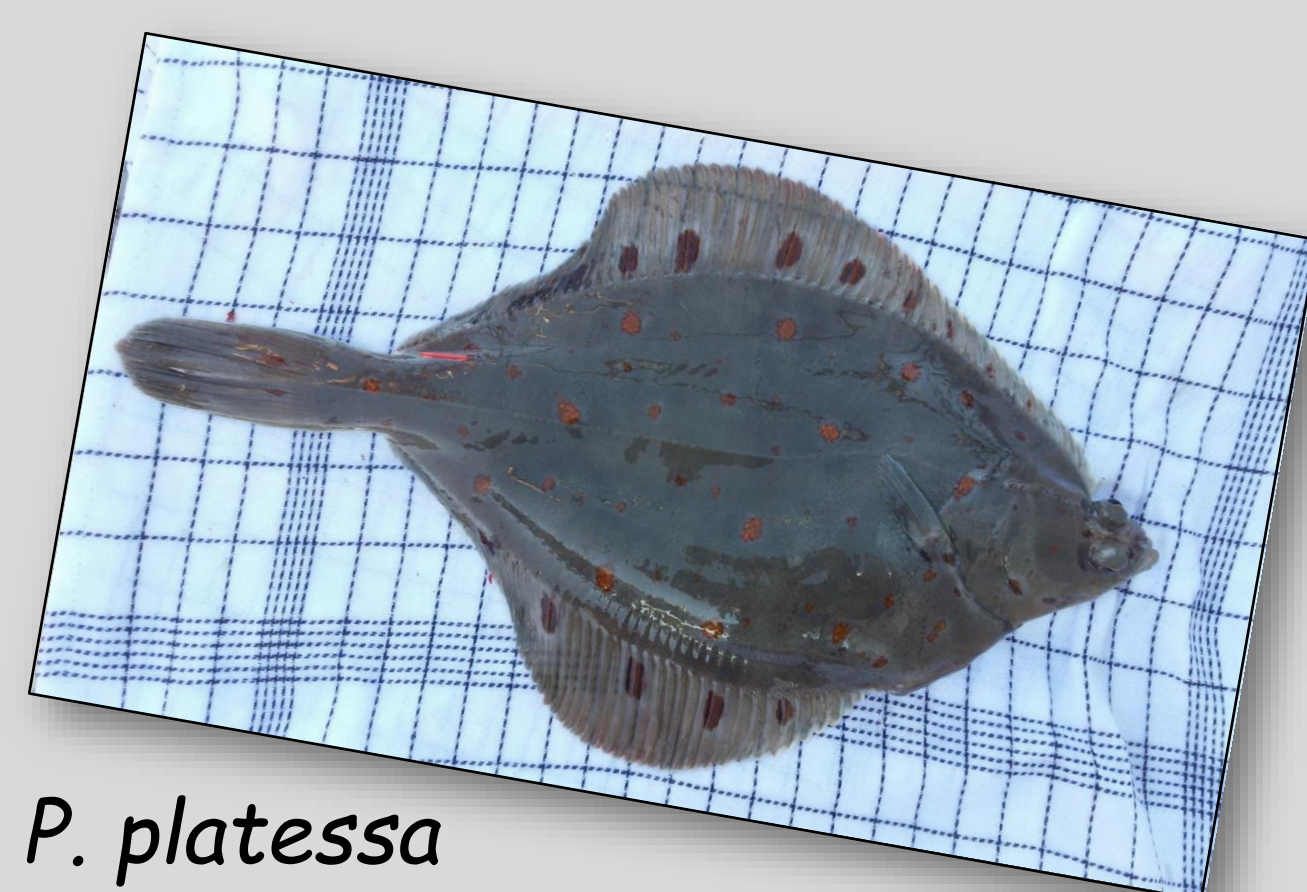
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## BACKGROUND

- The Common Fisheries Policy of the European Union has enacted a landing obligation, prohibiting the discard of quota regulated fish species.
- The regulation includes the possibility of exemption from landing obligations for “species for which scientific evidence demonstrates high survival rates”.
- European plaice (*Pleuronectes platessa*) is a key species for the gill-netters in the North Sea, Skagerrak, and Kattegat.
- Discard survival in plaice have been assessed in fish from beam and otter trawls but data on fish from set-nets (trammel and gillnets) is inadequate.



*P. platessa*

## OBJECTIVES

- Determine post-capture survival rate in plaice from commercial gill-netters fishing with trammel nets.
- Identify catch-related physical, physiological, and environmental factors associated with reduced survival.



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## METHODS

- Fish were collected over 7 days between November 2017 and February 2018.
- Fish were transported to shore in 300L tanks with oxygenated seawater within 2-3 hours of capture.
- Fish were transferred to livewells and monitored for post-capture survival for 4-10 days.
- Catch-related injuries and reflex impairments were assessed immediately after capture and at the end of the observation periods.

## Experimental factors and tools

Species : European plaice (*Pleuronectes platessa*)  
Number of animals : 118  
Fish length (cm) :  $33.4 \pm 0.3$  (22-40)

Vessels : H 32 - Fuglen and NF 76 - Duddi Krog  
Fishing zones : ICES subsquare 23 (The Sound) and 22 (Belt Sea)  
Chains : 13  
Net type : Trammel net  
Nominal inner/wall mesh sizes (mm) : 75/350

Soaking time (hours) :  $27 \pm 2$  (19-47)  
Depth (meters) :  $11 \pm 1$  (7-18)  
Deck temperature (°C) :  $3.6 \pm 0.6$  (-0.1-6.0)  
Bottom temperature (°C) :  $4.4 \pm 0.5$  (2.1-7.1)  
Air exposure duration (sec) : 15-30

Livewell temperature (°C) :  $3.4 \pm 1.5$  (0.5-7.0)  
Livewell oxygen saturation (%) :  $94 \pm 1$  (87-98)  
Livewell salinity (ppt) :  $11.1 \pm 0.5$  (9.7-12.4)  
Post-capture observation duration (days) : 4-10

## Reflex - Stimulus and responses

- Righting : Righting itself when turned upside down under water.
- Evasion : Swims toward the bottom when released at the surface.
- Tail grab : Struggle or tries to escape when tail is held between two fingers.

## Injury - Description

- Bruises (<10% / 10-50% / >50%) : Discoloration and scale loss.
- Fin fraying : Shredding of the thin skin between the fins.
- Blood clots : Blood clots visible through the skin.
- Minor wounds (Head / Body) : Shallow cuts or punctured skin.
- Deep wounds (Head / Body) : Deep cuts or punctured skin, often with Bleeding.
- Intestines : Intestines visible through the anus.
- Net-mark : String cuts from net contact.
- Egg : Visible pregnant

**Table 1** For reflexes, individuals was scored 0 if the response was completed, or 1 if the response was not completed (i.e., impaired). For injuries, individuals was scored 0 if the damage was absent, or 1 if the damage was present (results in Figure 1).

## RESULTS

- Post-capture survival rate was 100% (i.e., all fish were alive at the end of the observation periods).
- Less than 10% of fish exhibited reflex impairments after capture and at the end of the observation periods.
- Approximately 10% of fish showed recovery of minor capture-related injuries at the end of the observation periods.



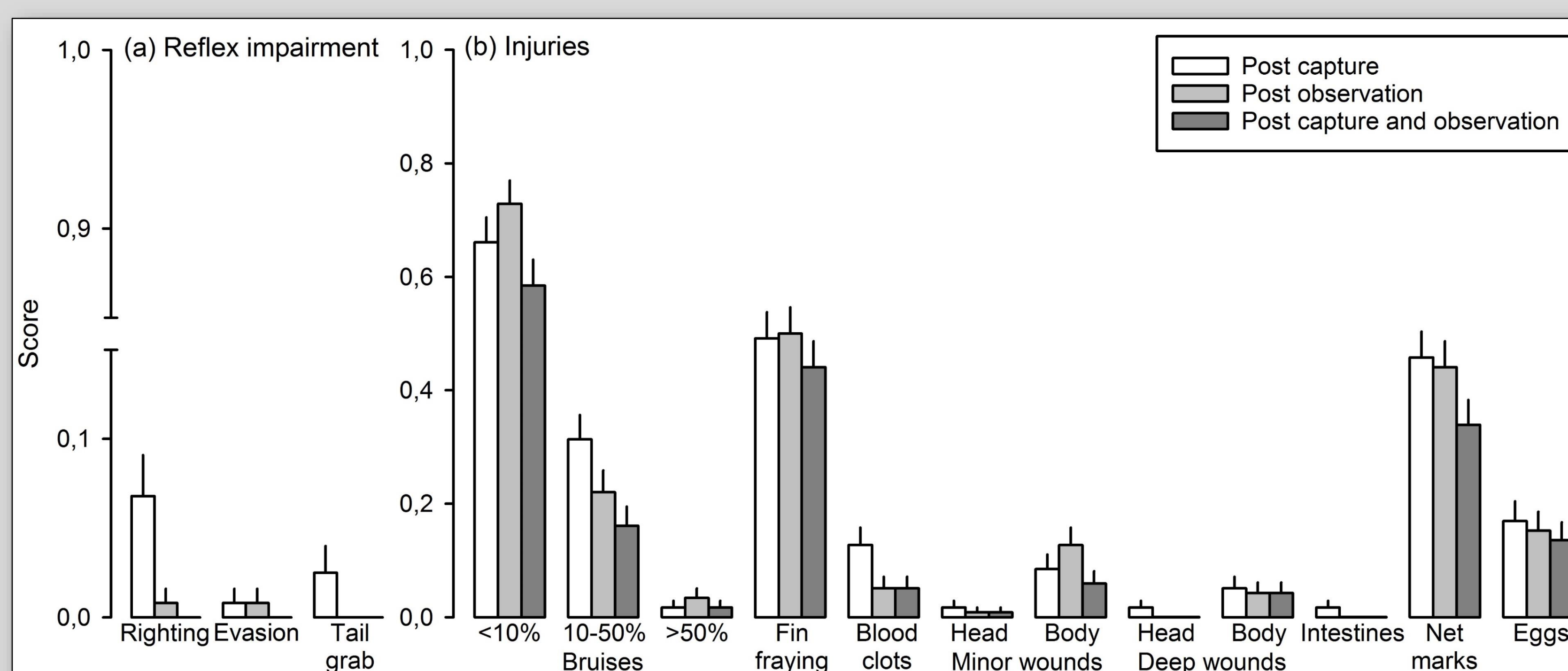
Fuglen



Duddi Krog



Livewells



**Figure 1** Proportion (mean  $\pm$  SEM) of impaired reflex responses (a) and injuries (b) in plaice (n=118) assessed after capture (white), and at the end of the observation period (light grey), and both after capture and at the end of the observation period (dark grey).

## CONCLUSION

- The 100% post-capture survival rate may be of relevance to policymakers regarding future claims made under the “high survival rates” exemptions rule in the Common Fisheries Policy of the European Union.
- The 100% survival rate is likely driven by one or more of the following experimental factors:
  1. Short duration of air exposure.
  2. Minor physical injuries.
  3. Low temperatures.
- Future studies during summer can provide information about the degree to which the high survival observed here is driven primarily by technical factors (air exposure and injuries), or environmental factors (temperature).



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