



Memo

To The Ministry of Food, Agriculture and Fisheries of Denmark

Reg. Assessment of the effect of using variable mesh sizes and optional selection panels on plaice (*Pleuronectes platessa*) survival when fishing for flatfish, roundfish and Norway lobster in scientific trials with Fully Documented Fisheries.

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Assessment of the effect of using variable mesh sizes and optional selection panels on plaice (*Pleuronectes platessa*) survival when fishing for flatfish, roundfish and Norway lobster in scientific trials with Fully Documented Fisheries.

22 December 2022
Journal no. 22/1017382

Request

For the preparation of a possible joint recommendation on changing the discard plan for the North Sea, The Ministry of Food, Agriculture and Fisheries of Denmark asks for scientific advice that compares the expected survival of plaice in the bottom trawl gear that is permitted to be used in the Skagerrak and Kattegat (and which appears from the exception provisions for high survival (article 6) of the disposal plan for the North Sea (attached) with:

- Trawl gear with variable mesh sizes and optional selection panels in a mixed fishery for flatfish, roundfish and Norway lobster in trials with camera monitoring.

The comparison can be made based on existing knowledge.

Reply

1. Existing high survival exemptions for plaice

There are currently high survival exemptions for plaice in a number of demersal trawl fisheries in the North Sea. These include:

- A survivability exemption for catch and by-catch of plaice in the fishery targeting flatfish or roundfish carried out with trawls with a mesh size of at least 120 mm in ICES division 3a and ICES subarea 4.
- A survivability exemptions for plaice caught with trawls with a mesh size of at least 90 to 99 mm equipped with Seltra panel targeting flatfish or roundfish in Union waters of ICES division 3a,
- A survivability exemption for plaice caught with trawls with a mesh size of at least 80 to 99 mm targeting flatfish or roundfish in Union waters of ICES subarea 4.
- A survivability exemption for catches of plaice below the MCRS caught with 80 to 119 mm beam trawl gears (BT2) in ICES division 2a and ICES subarea 4 for gears equipped with the flip-up rope or Benthos release panel (BRP) and caught by vessels with an engine power of more than 221 kW,
- A survivability exemption for catches of plaice below the MCRS caught with 80 to 119 mm beam trawl gears (BT2) in ICES division 2a and ICES subarea 4 for vessels of Member States implementing the roadmap for the Fully Documented Fisheries,
- A survivability exemption for catches of plaice below the MCRS caught with 80 to 119 mm beam trawl gears (BT2) in ICES division 2a and ICES subarea 4 for vessels with an engine power of not more than 221kw or less than 24 m in length overall, which are constructed to fish in the twelve miles zone, if the average trawl duration is less than ninety minutes.

2. Factors known to influence survival rates in Danish waters

Many factors are known to influence discard survival, each stressor and the additive effects of multiple stressors influencing the survival of an individual (Breen and Catchpole, 2021):

- biological, e.g., species, size, age, physical condition, or occurrence of injuries,
- environmental, e.g., changes in temperature, depth, or light conditions,
- and technical, e.g., fishing method, catch size and composition, handling practices on deck, or air exposure.

Three published studies in the Danish commercial trawl fishery targeting plaice in Skagerrak/Kattegat have demonstrated that the most important factors in determining survivability are:

- **Air exposure**, with a threshold observed at air exposure >60 min (Methling et al., 2017; Noack et al, 2020);
- **Season**, with higher survival in winter than in summer (Savina et al., 2019);
- **Catch composition**, with lower survival when the catch is mixed with spiny crustaceans such as Norway lobster (Savina et al., 2019).

3. The effect of using variable mesh sizes and optional selection panels on plaice discard survival

The number of factors known to influence the survivability of plaice makes it rather difficult to establish the contribution that changes to trawls, e.g. panel size and placement, and codend mesh size, have on the survivability of plaice. Allowing for adaptations to fishing gears may even improve survival rates. For example, In the Danish commercial trawl fishery in Skagerrak/Kattegat, an improvement in discard survival of undersized plaice was possible when targeting *Nephrops* using a divided codend with a 60 mm square mesh lower compartment (61%, CI: 48–73%), but without a significant difference from the 90 mm diamond mesh standard codend (37%, CI: 14–54%) (Savina et al., 2019). Furthermore, a specific comparison between mesh sizes on discard survival of roundfish and Norway lobster in the North Sea showed no significant difference (Wileman et al., 1999). Despite this, a recent STECF report states that codend mesh size and construction is likely to have an impact on survival, particularly for small plaice (STECF-22-05). However, there is no scientific documentation, to our knowledge, supporting such observation.

With respect to a change in mesh size, we however know that it will influence catch size, which may increase when reducing mesh size. Catch size is also correlated with haul duration, and eventually air exposure depending on how the sorting is organized on deck.

4. Exemption in the mixed demersal fishery

Considering that none of the reports we are aware of show an effect of mesh size, and that season and air exposure are known to be the main factors influencing survival in the Danish waters, it is our expert opinion that the survivability of plaice in trawls using variable mesh sizes and optional selection panels would be relatively

high. In addition, the same Danish vessels fish in the North Sea as in the Kattegat, and therefore the operational conditions, and especially those of relevance here, i.e., sorting on deck, can be expected to be similar.

Based on existing high survival exemptions for plaice, as stated above, and the factors known to influence survival rates of plaice, it is our expert opinion that there will be little-to-no impact on the plaice stock in the Skagerrak and Kattegat by allowing vessels fitted with electronic monitoring (EM) systems and participating in Fully Documented Fishery trials to fish with trawl using variable mesh sizes and optional selection panels. EM offers the possibility to document entire catches while the scientific trials offer the possibility to monitor how changes to fishing gears, in this case reduce mesh sizes, influence catch compositions. With this in mind, the necessary documentation on how EM in collaboration with more flexible technical measures regulations regarding fishing gear specifications will be collected.

If further information is required, DTU Aqua can provide data collected by the observers at sea with respect to environmental, biological, and operational factors in the North Sea and Kattegat by the Danish vessels.

References

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