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Aged and children first!
Challenges in the development of a new selectivity concept for trawl fisheries

Stefanie Haase*, Juan Santos, Annemarie Schütz, Bernd Mieske, Daniel Stepputtis

Importance of aged and big fish

- increased fecundity (more eggs)
- increased egg quality and therefore higher chances of survival
- extended spawning period, thus increased probability to find suitable condtions for larvae

→ a higher abundance of big fish in the stock might increase its reproductive success

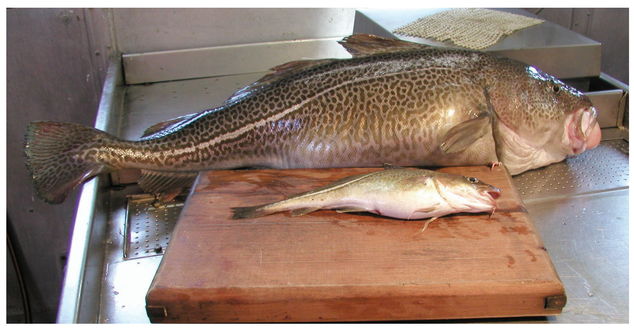

Figure 1: Comparison of body and gonad size of a 30 cm (bottom) and 75 cm (top) cod (pictures M. Bleil)

Conclusion

The challenge to exclude big fish, additionally to small fish, from the catch can be solved by supplementing a commercial trawl with a grid. Small changes in this alternative grid design alter the exploitation pattern (Figure 4). This new approach showed that different selection patterns are possible for trawlers which can contribute to a more sustainable fishery.

The codend selectivity in trawl gears is normally achieved by allowing small fish to escape. The probability of escapement decreases with increasing body size. Thus, very large fish have no chance to escape and are caught in the codend (Figure 2).

Recent studies hypothesize that reducing the catchability of aged fish can be a key strategy for the sustainable use of fish stocks.

Standard selectivity in trawl gears makes the avoidance of big fish in the catch challenging. We addressed this challenge by supplementing the codend selectivity of a standard trawl with a grid system (Figure 3).

Aim of this study was to demonstrate that small and big fish can be simultaneously avoided in the catch. Further, we tested different designs of the grid to find the best performance of the new selectivity concept.

Standard trawl selectivity

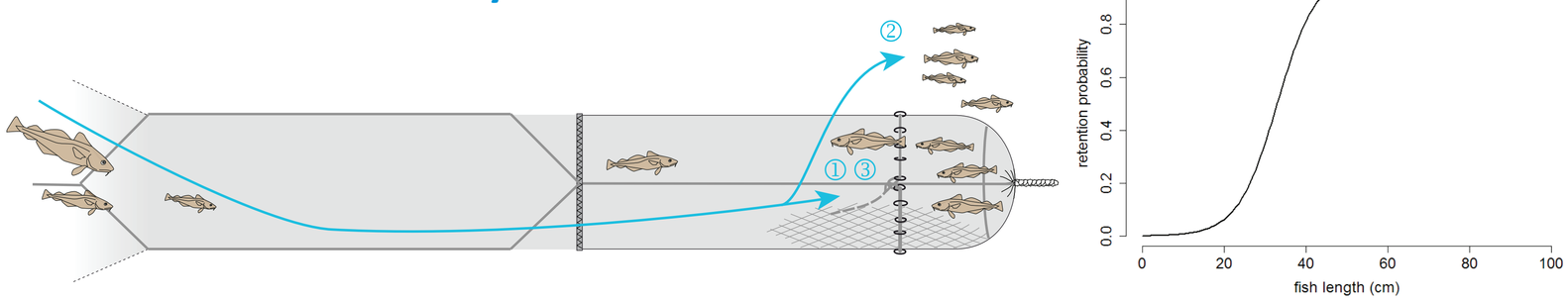

Figure 2: Small fish (2) have a low probability to be retained in the codend of a trawl using mesh selection. Medium (3) and large fish (1) are caught (see related standard selection curve on the right).

New concept

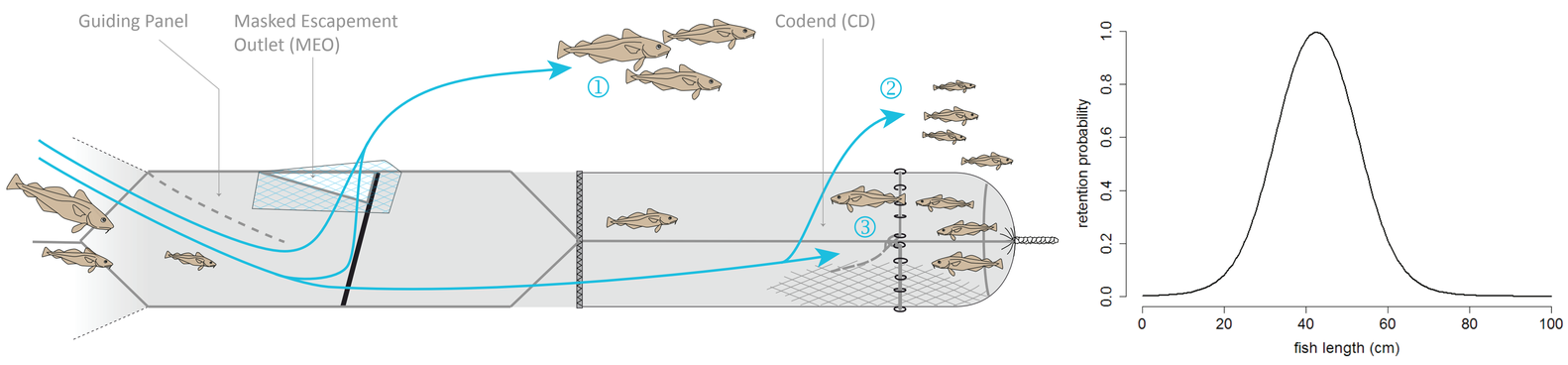

Figure 3: Large fish (1) do not fit through the steel grid and can escape through an outlet in the upper part of the net. Small fish (2) can escape through meshes in the codend. Medium sized fish (3) are caught (see related bell shaped selection curve on the right).

Effect of bar spacing

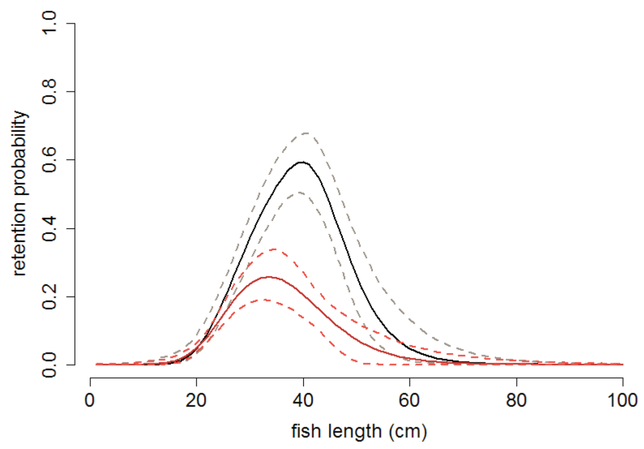

Figure 4: Comparison of the retention probability of 42.5 mm (red) and 50 mm (black) bar spacing.

Effect of masked escapement outlet

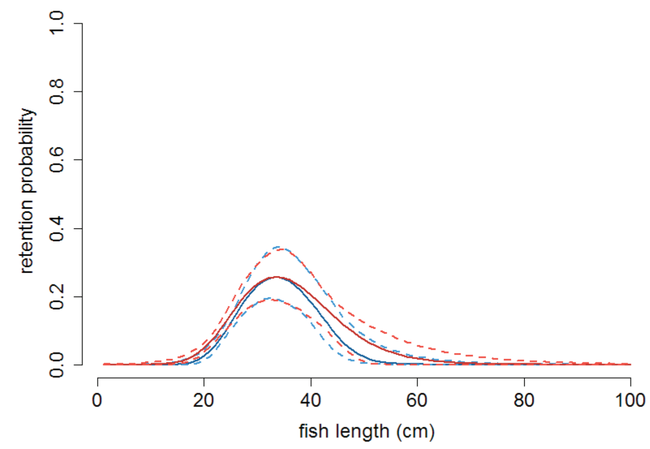

Figure 5: Comparison of retention probability with (red) and without (blue) net panel to cover the escapement outlet above the grid (bar spacing 42.5 mm each).

THÜNEN Institute of Baltic Sea Fisheries, Alter Hafen Sued 2, 18069 Rostock, Germany | Travel was supported by the ASC travel fund.

*steffie.haase@web.de
juan.santos@thuenen.de