PROFET Policy

TECHNICAL LEAFLET

Policy-relevant issues in Aquaculture & Fisheries

Reference No. FF-ALL-GEAR-05

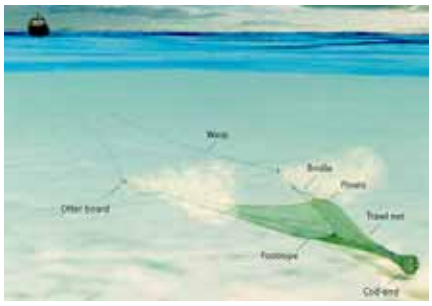
"SURVIVAL"

Surviving the trawl

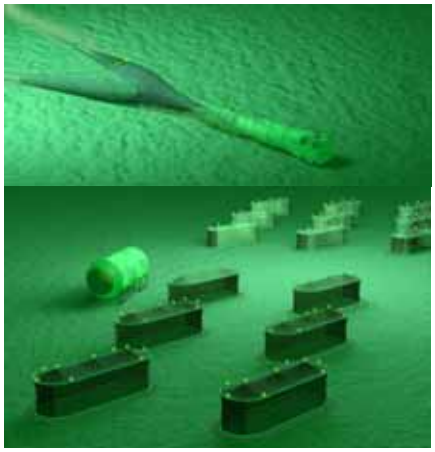
Improving the selectivity of fishing gear constitutes an important conservation tool. It is widely used in fisheries management to minimise the discarding of unwanted (non-targeted) and undersized (immature) fish and to ensure fish reach their optimal size before harvesting. The efficacy of selective fishing trawls depends on the assumption that escaping fish will survive, grow and help sustain the exploited population.

This is however not always the case. Project SURVIVAL—an international collaboration between leading European Fisheries Institutes and partly funded by the EU—demonstrated that some gadoid fish, in particular small haddock and whiting, do die after escaping from trawl codends.

The greatest challenge in project SURVIVAL was to successfully sample fish escaping from a trawl codend and then hold them in captivity, while ensuring these actions did not kill the fish. In this way, any observed mortality would only be the result of being caught and then escaping from a trawl.



A new sampling cover was designed that does not affect the flow of water around the trawl codend, but where fish escaping from the trawl codend are collected in an environment with low hydrodynamic flow, so ensuring that they are not exposed to additional stressors by being forced to swim beyond their limits of endurance. In addition, a new method for decompressing these fish samples when they are taken out of deep water for survival studies was described. The fish were then transferred by divers into seabed cages, where they were observed and fed for at least 7 days. Alternatively, where divers could not be used (i.e. in the Barents Sea), a larger cover design was used which doubled a s a seabed cage, when it was remotely released from the trawl.



Using these techniques, SURVIVAL aimed to **estimate mortality in gadoid fish species (cod, haddock and whiting) after passing through selection grids or trawl meshes**. Various circumstances, such as fishing intensity on the fishing ground, season, and physical condition of the fish, were taken into account.

To estimate the frequency of repeated encounters of gadoids with trawls on intensively fished grounds, a PIT-tag technique was developed and used in a full-scale fishing experiment in the Barents Sea. More than 3500 cod were tagged and released alive during two subsequent seasons, and between 8 and 9% were detected

Project acronym:
SURVIVAL

Full title of Project:
An assessment of mortality in fish escaping from trawl cod-ends and its use in fisheries management.

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Web-site:
www.imr.no/survival

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"THE SURVIVAL PROJECT HAS DEMONSTRATED THAT SOME GADOID FISH DO DIE AFTER ESCAPING FROM TRAWL CODENDS, ALTHOUGH THESE ESTIMATES OF ESCAPE MORTALITY ARE CONSIDERABLY LOWER THAN IN PREVIOUS STUDIES"

or "recaptured" by the sampling trawls at least once. Survival was generally very high and no significant difference was found in the survival of cod and saithe caught in areas with high and low fishing intensity. However, no conclusions could be made about the survival of haddock, which were detrimentally affected by the captivity conditions in this experiment.

Of the gadoid species, cod (and saithe in the Barents Sea) appear to be least affected by the trauma of capture and escape. However, the survival of escaping haddock and whiting is highly dependent upon their size, with the probability of survival being lowest among fish of 15 cm in length and less. Moreover, in any one length class, it is the fish with the smallest weight that are most likely to die following their escape from the trawl. It was argued that the main cause of observed mortality amongst the smaller fish may be the result of injuries and stress experienced during the capture process itself, and not necessarily as a result of escaping through the codend meshes, whereas the mortality in larger fish was the result of the physical trauma and injury of passing through the codend meshes. Additional stressors are likely to reduce the survivability of escaping fish. For example, the mortality of haddock escaping at the surface (during haul back of the trawl) was significantly higher than that of fish escaping at depth during towing. This increased mortality was most likely the result of hyperbaric injuries and suffocation at the surface. In addition, a proportion of the dead fish may simply have been washed out from the already dead component of the catch by wave action at the surface.

The SURVIVAL project has demonstrated that some gadoid fish do die after escaping from trawl codends, although, due to improvements in experimental techniques, these estimates of escape mortality are considerably lower than in previous studies. These results have proven to be of significant importance, particularly since the regulations laying down technical conservation measures for the Mediterranean (Council regulation 1626/1994), the North Sea (including Kattegat and Skagerrak) and the Atlantic (Council regulation 850/1998), and the Baltic Sea (Council regulation 88/1998) are currently under revision. After all, failing to take account of escape mortality could mean the potential benefits of selective devices as technical conservation measures are overestimated.

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