

# Sole in the Irish Sea: Do fishermen and fisheries-scientists see things from a different perspective?

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Fishing opportunities for sole (*Solea solea*) in the Irish Sea have declined severely in recent years. Due to consecutive TAC reductions Belgian fishermen fear the loss of a historically important fishing ground and claim that the low numbers observed in the British beam trawl survey (UK-BTS) do not reflect what they observe at sea: a healthy stock consisting of a broad age distribution. To determine whether this is a true mismatch between science and industry a Fisheries Science Partnership (FSP) was set up in order to gather additional information on sole in the Irish Sea.

From 2013 onwards, the data collection on commercial fishing trips to the Irish Sea was intensified. This fisheries-dependent data showed that for some parts of the Irish Sea catches (LPUE) have remained stable or even increased. However, since 2016 directed fisheries for sole in the Irish Sea is no longer allowed, making it difficult to follow up. Consequently, the scientific survey remains in the sole assessment as the most important data source. Fishermen are sceptical about scientific surveys, especially when livelihoods are at stake. More specifically, the reliability of the scientific method for data collection is questioned.

As part of the Irish Sea project (IRIS), funded by the European Maritime and Fisheries Fund (EMFF), ILVO organized an industry survey. This type of scientific survey involves close collaboration with the fishing industry. A commercial beam trawler was chartered to deliver information on areas (and species) that are not covered by the scientific survey. Moreover, an industry survey aims to improve communication between scientists and fishermen and aspires to gain industry support in scientific methods for fisheries data collection. Three main research questions were focussed on: 1) What is the distribution of sole in the Irish Sea, investigating also areas not covered by the UK-BTS? 2) Is there a difference in catch composition between the research vessel and commercial vessel? 3) What is the geographical origin of sole in the Irish Sea?

The industry survey was organized from 15/09/16 – 02/10/16, where the commercial beam trawler Jasmine (Z.483) performed parallel fishing with RV Endeavour (performing the scientific beam trawl survey UK(E&W)-BTS-Q3) in 28 locations. Another 42 locations, systematically spread over 11 ICES statistical rectangles in the Irish Sea, were sampled only by the commercial vessel to gather information on sole and other demersal fish species. To study the geographical origin and reveal important nursery grounds of sole, tissue and otoliths were collected (spring and autumn) from the Irish Sea and the adjacent areas of the Celtic Sea and Bristol Channel. Samples were analysed using three different stock identification techniques conducted at KU Leuven (next-generation sequencing, otolith shape analysis and otolith elemental analysis).

First results show that in almost all statistical rectangles more than half of the catch was above minimum landing size (24 cm). However, proportionally more juvenile sole (< 24 cm) were caught in the eastern part of the Irish Sea (ICES statistical rectangles 36E6, 37E6 and 38E6), implying the presence of the nursery grounds. In that area also proportionally more sole (in numbers and weight) were caught. No other areas with exceptionally high numbers of (juvenile) sole were found and the catch composition (*i.e.* size distribution) of the conventional scientific survey agrees with the industry survey. Moreover, no other commercial species were caught by the commercial vessel compared to the scientific survey. Finally, during the survey a close and positive collaboration between scientists and fishermen was established.

These findings do not yet solve the problem of the opposing perceptions on the abundance of sole. Perhaps there is no mismatch between science and industry, but the fish observed by the fishermen were born elsewhere and therefore not detected by the scientific survey on the main nurseries in the eastern Irish Sea. Further research will provide more insight on the geographical boundaries of the Irish Sea sole stock, with potential implications for future management of this stock.

Keywords: *Solea solea*; Irish Sea; Fisheries Science Partnership (FSP); industry survey; stock identification