

Age Determination and Growth Rate Investigation of *Solea solea* Juveniles Through the Reading of Otoliths' Daily Growth Rings

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Fishing pressure represents one of the main threats and drivers of change in a marine ecosystem, thus efficient management must be a priority for sustainable blue growth. This study aims to investigate the population dynamics of common sole (*Solea solea*) in the Southern part of the North Sea. Variation in survival and coastal recruitment in the species are believed to be caused by complex dispersal patterns and hydrodynamics. Limited but sufficient connectivity has been proven to shape metapopulations within the area, hence why a deeper knowledge about sole dispersal mechanisms is crucial for the understanding of yearly stock-sizes variations and promotion of a long-lasting sustainable exploitation of the species. This research will determine the age at capture and at the different life-history events of common sole juveniles through the reading of daily growth rings in their otoliths, which are discernible within the first year of life of an individual. From otolith-fish size relationship and daily rings width, larval and juvenile growth rates will be derived. Together with otolith microchemistry and shape analysis, this is a powerful informative tool to gain an insight into early events experienced by this species. This information could help display spatial and temporal variability of life-history traits such as pelagic larval duration, metamorphosis and settlement, but can also provide information on nursery habitat quality. The results of this study will be combined with an existing larval dispersal model for common sole in the North Sea, where local hydrodynamics, larval active behavior and possible climate change scenarios are combined and can possibly reveal the pattern followed by the juveniles. Finally, they will be compared with previous studies of otolith microchemistry and shape analyses performed on the same samples. The results of this study will provide important information about common sole in the North Sea, which is especially critical to Belgium and the surrounding countries because of their dependence on flatfish fisheries as an economic resource.

Keywords: Sustainable fishery; *Solea solea*; Daily growth rings; Otolith; Age determination; Growth-rate