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B-FishConnect: a multi-disciplinary approach targeting flatfish connectivity and population dynamics in the Southern North Sea.

Marine populations display some of the most extreme patterns of spatial and temporal heterogeneity in demographic factors. Larval dispersal connects distant subpopulations, with strong implications for population dynamics and persistence, biodiversity conservation and fisheries management. Due to a highly complex window between biological needs and favorable environmental factors, marine species are very susceptible to perturbations in the environment. This leads to unpredictable reproductive success, high larval mortality and obscure population delineations. The B-FishConnect project strength lays in its multi-disciplinary approach. It disentangles the biophysical factors influencing dispersal and recruitment in flatfish. An intensive sampling campaign was set up to gather empirical data of larval and juvenile flatfish in several nurseries on the Belgian part of the North Sea in order to understand local dispersal and recruitment dynamics. Empirical data compared to a Lagrangian larval transport model, coupled with an Individual-Based Model, showed that a short larval duration, tidal migration and high mortality represent the most realistic dispersal scenario. Genomics (ddRADseq), otolith microchemistry and shape analysis allowed to distinguish subpopulations of flatfish on a small spatial scale. Small-scale differences in habitat characteristics were investigated by analyzing juvenile flatfish growth through otolith-analysis, biological indices and stomach metabarcoding. Results show that there is spatial and annual variation in body condition which can influence recruitment variability. The project combines multiple approaches to give insights in population structure, recruitment and dynamics of flatfish in the Southern North Sea.

Keywords: larval dispersal, population connectivity, population dynamics