

RESPONSE OF DOVER SOLE TO CLIMATE CHANGE: PHYSIOLOGICAL AND BEHAVIOURAL CONSIDERATIONS

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In order to understand and predict the effects of climate change on flatfish it is necessary to know how the organisms respond to changes in water temperature. Responses may be measured in terms of physiology and temperature related growth potential, but behavioural responses and temperature preferences may also be considered in relation to migration and distribution shifts. Here we present results from a combination of studies aimed to better understand the response of Dover sole to changes in temperature. In turn, these results should improve existing modelling studies of climate change impacts on flatfish. Modelling studies generally lack good data on accurate optimal temperatures and tolerance ranges of different species. Our first study considers the optimal growth temperature of sole in relation to size. Based on an experimental set up where two size classes of sole were kept at a range of temperatures and fed ad libitum, we show that as sole grows, optimal temperature declines. This is key to understanding how climate change may differentially affect the various life stages. In a more sophisticated set-up using a circular preference chamber and presenting sole with a gradient of temperatures to choose from, we show that determining the optimal growth temperature by looking at temperature preference is not straightforward for sole and does not follow the same trend seen in other fish species. Discrepancies between optimal growth temperature and temperature preference of sole may hamper our interpretation of modelling results and our ability to predict a species response to climate change. Finally we discuss the effect of food limitation on optimal growth temperatures and discuss the importance of considering the interaction between temperature and food availability when making future projections.