

{rokbox title=|Merluza (Merluccius merluccius) :: Foto: COB-IEO|
thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-manolo-hidalgo-merluza-durant-et-al-2013-thumb.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-manolo-hidalgo-merluza-durant-et-al-2013.jpg{/rokbox}

Joël M. Durant, **Manuel Hidalgo**, Tristan Rouyer, Dag Ø. Hjermann, Lorenzo Ciannelli, Anne Maria Eikeset, Natalia Yaragina, N. C. Stenseth, (2013). [Pop](#)

[ulation growth across heterogeneous environments: effects of harvesting and age structure](#)

. Marine Ecology Progress Series (MEPS). 480:277-287. In Theme Section "

[Harvested fish stocks in a changing environment](#)

". Editors: J.M. Durant, N.C. Stenseth. MEPS 480:277-287 (2013)

Abstract: Population growth is affected by several factors such as climate, species interaction and harvesting pressure. However, additional complexity can arise if fishing increases the sensitivity to environmental variability. To predict the effects of fisheries and climate on marine populations, there is a need for improved understanding of how they affect key ecological processes such as population growth. In this study, we used a comparative approach investigating commercially fished species across different ecosystems: the Norwegian Sea-Barents Sea (Northeast Arctic cod), the North Sea (North Sea cod), the Atlantic Ocean (European hake), the Mediterranean Sea (European hake), and the Gulf of Alaska and Bering Sea (walleye pollock). Our objective was to compare the effects of commercial fisheries, age structure and environmental variability on population growth rate. We show that although all stocks experienced a decline in abundance, only 3 of them showed a concomitant decreasing trend in generation time (South Atlantic hake, North Atlantic hake and Northeast Arctic cod), suggesting a fishing-induced erosion in their age structure. Intra-specific analysis shows that changes in generation time triggered an increase in the relative contribution of recruitment to population growth. Furthermore, the contribution from recruitment to population growth changes due to large-scale climate indices or regional-scale environmental covariates, such as sea temperature. This study illustrates how and where the interaction between large-scale ecological patterns and regional/short-scale processes are important for designing management regulations.

Keywords: Barents Sea, Mediterranean Sea, Bering Sea, Cod, *Gadus morhua*, European hake, *Merluccius merluccius*, Pollock, *Theragra chalcogramma*, Leslie matrix, Fisheries