Inter-annual variability in somatic growth rates and mortality of coastal fishes off central Chile: an ENSO driven process?

Eduardo Hernández-Miranda, F. Patricio Ojeda

Abstract

The effects of El Niño (EN) and La Niña (LN) events upon marine organisms inhabiting the Eastern Pacific coast have been widely studied in recent years, concentrating primarily on changes in species composition and on population size. In this study, using somatic growth rates as metabolic response variables, we evaluated the mortality rates of coastal fishes inhabiting a central Chilean upwelling marine ecosystem in the South Pacific between 1990 and 2003. Four coastal fish species belonging to different trophic levels (one herbivore, one omnivore, and two carnivores) were analyzed. In all species, the estimated cohort somatic growth rates were low for those recruited during EN and high for those recruited during LN events. Annual cohort mortality rates were highest during EN events and lower during LN and transitional years. We propose that productivity (as a bottom-up driver) acts as a primary exogenous factor upon annual cohort mortality rates. We also propose that a plausible mechanism underlying this process is the negative effect the low somatic growth rates may have on fish ecological attributes such as their competitive abilities, condition factors, and predation risks, which ultimately may affect their fitness.