{rokbox title=|Sardina pilchardus :: Fuente: Wikipedia| thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-patricia-reglero-ecofisiologia-pequeños-pelagicos-peck-et-al-2013-thumb.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-patricia-reglero-ecofisiologia-pequeños-pelagicos-peck-et-al-2013.jpg{/rokbox}

Myron A. Peck, Patricia Reglero, Motomitsu Takahashi, Ignacio A. Catalán, (2013). **Life cycle ecophysiology of small pelagic fish and climate-driven changes in populations**. Progress in Oceanography. Volume 116, September 2013, Pages 220–245.

Abstract: Due to their population characteristics and trophodynamic role, small pelagic fishes are excellent bio-indicators of climate-driven changes in marine systems world-wide. We argue that making robust projections of future changes in the productivity and distribution of small pelagics will require a cause-and-effect understanding of historical changes based upon physiological principles. Here, we reviewed the ecophysiology of small pelagic (clupeiform) fishes including a matrix of abiotic and biotic extrinsic factors (e.g., temperature, salinity, light, and prey characteristics) and stage-specific vital rates: (1) adult spawning, (2) survival and development of eggs and yolk sac larvae, and (3) feeding and growth of larvae, post-larvae and juveniles. Emphasis was placed on species inhabiting Northwest Pacific and Northeast Atlantic (European) waters for which summary papers are particularly scarce compared to anchovy and sardine in upwelling systems. Our review revealed that thermal niches (optimal and sub-optimal ranges in temperatures) were species- and stage-specific but that temperature effects only partly explained observed changes in the distribution and/or productivity of populations in the Northwest Pacific and Northeast Atlantic; changes in temperature may be necessary but not sufficient to induce population-level shifts. Prey availability during the late larval and early juvenile period was a common, density-dependent mechanism linked to fluctuations in populations but recruitment mechanisms were system-specific suggesting that generalizations of climate drivers across systems should be avoided. We identified gaps in knowledge regarding basic elements of the growth physiology of each life stage that will require additional field and laboratory study. Avenues of research are recommended that will aid the development of models that provide more robust, physiological-based projections of the population dynamics of these and other small pelagic fish. In our opinion, the continued development of biophysical models that close the life cycle (depict all life stages) offers the best chance of revealing processes causing historical fluctuations on the productivity and distribution of small pelagic fishes and to project future climate-driven impacts. Correctly representing physiological-based mechanisms will increase confidence in the outcomes of models simulating the potential impacts of bottom-up processes, a first step towards evaluating the mixture of factors and processes (e.g. intra-guild dynamics, predation, fisheries exploitation) which interact with climate to affect populations of small pelagic fishes.

Keywords: