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Research

How life history determines time scale sensitivity and extinction risk of age-structured populations

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The long-standing ecological interest in how environmental variability interacts with population dynamics to determine population variability and extinction risk has led to significant recent progress, but still lacks a direct connection to the role of a species' life history. Not only is environmental variability expected to increase with climate change, but the spectrum of environmental variability may shift, and there is a question about which life histories will be sensitive to such changes. To address this question for age structured populations, we compared environmental responses of 16 Atlantic cod populations with different life histories (longevities 7–17 years). We analyzed the sensitivities of these populations to high and low frequencies of environmental variability using simulations and analytical metrics of stability and transient dynamics to show that: 1) population's total sensitivity to all frequencies of environmental variabil