Weak connectivity and population cohesiveness in rudderfishKyphosus sandwicensis(Teleostei: Kyphosidae) inhabiting remote oceanic islands

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Abstract

Population connectivity has a fundamental role in metapopulation dynamics, with important implications in conservation. Easter Island (EI) and Salas y Gomez Island (SG) in the Pacific Ocean are ideal for the study of population connectivity because they are separated by 415 km and isolated from other islands in the Pacific Ocean by >2,000 km. Considering that dispersal processes could play a critical role in the persistence of its populations, the connectivity pattern of the rudderfishKyphosus sandwicensiswas evaluated between EI and SG using both a population genetics and a biophysical modelling approach. The variability in the control region of the mitochondrial DNA did not show a significant phylogeographical pattern, and the variability in 16 microsatellite loci suggested that individuals ofK. sandwicensislocated at EI and SG belong to the same genetic population. However, historical migration showed that 0.2% of the recruits at EI come from SG and that 0.15% at SG come from EI per year. Using simulated larval release during September and a larval development of 30 days in the plankton, biophysical modelling did not detect migration between the islands. Furthermore, self-recruitment shows interannual variation ranging from 5 to 10% of the total released larvae. Whereas the genetic data showed a lack of population genetic structure but low connectivity ofK. sandwicensisbetween EI and SG, the biophysical modelling showed null movement of particles between the islands. Stochastic movement of larvae or adults could explain the pattern observed, with rafting as an example. These low-frequency and stochastic movements may be important in maintaining the cohesiveness between EI and SG.

Palabras clave

Palabras clave de autor:marine protected areas; population connectivity; Rapa Nui ecoregion; reef-associated fish
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