



A bio-oceanographic filter to larval dispersal in a reef-building coral

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Limnol. Oceanogr., 51(5), 2006, 1969-1981 | DOI: 10.4319/lo.2006.51.5.1969

ABSTRACT: Gene flow was shown to be limited between western and eastern Caribbean populations of the reef-building coral, *Acropora palmata*. However, some mixing was detected among populations near Puerto Rico. Our genetic analyses categorize *A. palmata* samples from the east coast of the Dominican Republic with the western Caribbean population, suggesting a filter to gene flow east of the Dominican Republic. To test the hypothesis of a present day bio-oceanographic filter occurring between Puerto Rico and the Dominican Republic (i.e., in the Mona Passage), we used a Lagrangian stochastic model (LSM) of larval dispersal, coupling coral life history characteristics with physical forcing. The model operated at two spatial scales: Caribbean-wide and focusing on the Mona Passage area. Results from the Caribbean-wide study showed no significant virtual larval exchange between the two populations. The small-scale model indicated that virtual larvae do not readily traverse the Mona Passage during the corals' reproductive season. Larvae released from Mona Island, in the center of the passage, are retained in the lee within topographically steered eddies, which act, together with the larval competency period, as a de facto filter to dispersal. Combined, our findings reveal the location of a seasonal filter to gene flow and its mechanism.

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