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Letter to the Editor

Marine larvae back home: Searching for the big wave

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Marine larvae lost in the ocean: searching for the big wave

The stability of marine invertebrate coastal populations depends on the larval supply to balance the adult mortality losses. Therefore, understanding the factors that dictate dispersal, arrival or return of larvae from the open deep sea to coastal habitats suitable for settlement might allow predictions of how global recruitment patterns and population dynamics will be in future ocean conditions.

Larval dispersal is a critical process since oligotrophic open oceans and exposure to predators lead to high mortalities. Moreover, several physical processes or mechanisms such as surface gravity waves, eddies, tidal currents, wind currents affect larval transport and survival (1). For instance, the presence of thermal fronts which are associated to a gradient of cooler waters onshore and warmer ones offshore (i.e. upwellings or homogenization of coastal waters) can act as a barrier, keeping larvae offshore and limiting the recruitment (2). After all these difficulties and obstacles have been overcome, larvae near the coast can detect and respond behaviorally to different chemical or physical cues (3,4). Recent findings suggest that larvae respond to natural sounds from the reef, produced by animals feeding, moving and calling each other, swimming actively towards this "chorus" and settling (5). Moreover, there is evidence that a far greater range of invertebrate taxa than previously thought can respond to acoustic cues (6).

However, although behaviour appears to be slowing many species dispersal, some of them, such as crustaceans, are advected from a few to dozens or hundreds of kilometers away from home (7). In the open ocean, the reef chorus is too weak to be detected by larvae and their final destination seems to depend mainly on sea currents, or perhaps there may be a "call of the wild" for these long distance swimmers from the reefs. This call might be related with the strongest natural sound coming from coastal areas: the breaking of waves in the surf zone. Noise associated with wave action on rocky shores or reefs can radiate out to approximately 10 km offshore (8) with frequency ranges detectable for marine invertebrate larvae (9).

Recently, it has been predicted that by the end of this century, wave heights will be smaller than current ones over a large percentage of the globe. The greatest decreases in wave heights are projected to be in the oceans of the northern hemisphere (10). In this potential scenario, considering its relationship with the breaking wave height, noise radiation might be reduced and associated response of larvae to sound would then become limited (11). Thus, climate change might have negative ecological consequences on the sustainability of benthic populations, since larvae would not easily hear the weakened call from the reef breaking waves and would consequently have a hard time finding their way back home.

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