

Thorrold, S. R., G. P. Jones, M. E. Hellberg, R. S. Burton, S. E. Swearer, J. E. Neigel, S. G. Morgan, and R. R. Warner. 2002. Quantifying larval retention and connectivity in marine populations with artificial and natural markers. *Bull. Mar. Sci.* 70(1) Suppl.: 291-308.

Quantifying larval retention and connectivity remains a major hurdle in the development of realistic spatially-explicit population models in marine systems. This lack of knowledge is primarily due to the difficulty of conducting mark-recapture studies in species that are characterized by the production of large numbers of small pelagic offspring that suffer high initial mortality rates. Advances in artificial and natural tagging methodologies have, however, significantly increased the ability of marine ecologists to track larvae throughout the pelagic larval phase and subsequent recruitment into benthic populations. Many of these empirical approaches are now possible with the development of DNA sequencing and mass spectrometric instrumentation in the last decade. The presence of artificial tags in recaptured individuals remains the only unequivocal method for marking marine larvae. However, the difficulties of tagging sufficient numbers of larvae, with negligible handling effects, are formidable. Natural tags, including genetic markers and geochemical signatures in calcified tissues, are rarely unique indicators of source location, but have a significant advantage because all larvae released from an area are indelibly tagged. Given the strengths and limitations of the techniques, an approach that combines two or more techniques will likely be necessary to quantify larval retention and connectivity over appropriate spatio-temporal scales. Where possible, such a multi-technique strategy should include both artificial and natural tags.