

GENETIC TOOLS FOR ASSESSING DIVERSITY : PATTERNS OF GENETIC VARIATION IN MARINE ORGANISMS

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The application of a variety of molecular methods to assay genetic variation in wild populations has provided the ability to distinguish morphologically cryptic species, and to determine the evolutionary relationships between them. These methods have also allowed the genetic architecture within species to be determined and this has revealed unexpected structure in widespread marine organisms. Recent work in the Indo-Pacific has demonstrated marked differences between Indian and Pacific Ocean populations, and some differentiation between SE Asian and Australasian populations. Relatively little genetic differentiation is seen over large regions which abut sharply with other such regions, suggesting that genetic structure reflect rapid dispersal associated with range expansion from a number of refugia. However, gene flow between such groups appears to be restricted, and contrary to traditional views there is no association of patterns of gene flow with present day ocean currents - and far less extensive dispersal than previously thought. These findings demand a reconsideration of the major factors influencing the evolution of marine species in the region, and are of importance in present-day management of wild resources. The ability to detect these patterns varies with the analytical approach used, and the importance of using a variety of approaches to assist interpretation is illustrated.