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POPULATION GENOMICS: MARINE ORGANISMS

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Journal

QUARTERLY REVIEW OF BIOLOGY, 96(1)

ISSN

0033-5770

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Publication Date

2021

Peer reviewed

Population Genomics: Marine Organisms
Marjorie Oleksiak and Om P. Rajora, editors
Springer, 2020

Recent advances in high-throughput DNA sequencing have made it possible to apply genomic approaches to the study of virtually any organism. This has had a huge impact on marine ecology. This volume provides a nice overview of those impacts and provides some insights into the diverse roles that genomics may play into the future. Consisting of 15 papers written by over 50 coauthors, the book is loosely organized into six "parts", each consisting of from one to five papers. Although most relevant topics receive at least some discussion, coverage is uneven. In particular, if your interests lie in marine microbial ecology, arguably where genomics has had its greatest impact, you best look elsewhere. That said, the volume has some excellent contributions. The single introductory paper (Part I) co-authored by the volume editors, Oleksiak and Rajora, easily rates as one of the highlights. It provides an excellent overview of the entire field of marine population genomics that is accessible to a broad audience and could be a great first reading assignment for any molecular ecology course.

Also strong are several of the contributions in Part V (focused on adaptation and speciation) and Part VI (conservation and resource management). Papers on sticklebacks and *Littorina* snails provide very readable and succinct reviews of the extensive studies of parallel adaptations in these systems. From a genomics perspective, the stickleback system is more highly developed and specific gene loci involved in repeated adaptations have been identified, but both systems deliver beautiful examples of how genomics can be used to test hypotheses arising from natural history observations. The three papers in Part VI provide nice overviews of the practical applications of genomic data, including monitoring marine invasive species, fisheries management, and the design of marine protected areas. While traditional genetic approaches in these areas intentionally focused on using only neutral genetic markers to assess population connectivity, these papers illustrate the trend toward increasing appreciation for including adaptive gene loci in management decisions. While citing important case studies, these papers are well focused conceptually and appropriate for broad audiences; I plan to use them in my undergraduate molecular ecology course.

I am a bit less enthusiastic about some of the other sections of the volume. For example, Part II is inappropriately named "Marine Microbiomes" and consists of a single paper arguing that coral microbiomes could be developed as biomarkers for coral reef health - an interesting perspective but hardly reflective of the broad role microbiome research has played in marine systems. In contrast, in Part III there is a rather long paper reviewing work on ctenophores and sponges where actually little genomic data exist. The rather encyclopedic paper reviewing the genomics of marine zooplankton taxa is useful, but the rapid pace of research is already making its substantial data tabulations obsolete. Finally, not all the papers targeted a broad audience; the single paper on seascape genomics (Part IV) presents a somewhat

difficult to read overview of the topic, sometimes dwelling on details of analysis likely to be understood only by practicing professionals.

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