

## Introduction

**Jeffrey M. Leis (contact author)<sup>1,2</sup>**

**William Watson<sup>3</sup>**

**Bruce C. Mundy<sup>4,5</sup>**

**Peter Konstantinidis<sup>6</sup>**

Email address for contact author: jeffrey.leis@utas.edu.au

<sup>1</sup> Ichthyology  
Australian Museum Research Institute  
1 William Street  
Sydney, New South Wales 2010, Australia

<sup>2</sup> Ecology and Biodiversity Centre  
Institute for Marine and Antarctic Studies  
University of Tasmania  
Hobart, Tasmania 7001, Australia

<sup>3</sup> Southwest Fisheries Science Center  
National Marine Fisheries Service, NOAA  
8901 La Jolla Shores Drive  
La Jolla, California 92037-1509

<sup>4</sup> Ocean Research Explorations  
P.O. Box 235926  
Honolulu, Hawaii 96789

<sup>5</sup> Bishop Museum  
1525 Bernice Street  
Honolulu, Hawaii 96817

<sup>6</sup> Department of Fisheries, Wildlife,  
and Conservation Sciences  
Oregon State University  
104 Nash Hall  
Corvallis, Oregon 97331

This volume of research papers was inspired by the career of H Geoffrey Moser (known to his colleagues and friends as Geoff) and, for those who knew him, by his generous personality (Mundy et al., this volume pages 3–19). It contains research on subjects that Geoff Moser himself undertook and championed, primarily on marine fish life-history and ontogeny. Although Geoff's research focused on the California Cooperative Ocean Fisheries Investigations (CalCOFI) region of the Northeast Pacific, the research presented here is from a wider range of marine and estuarine regions, for the research approaches and themes he undertook were not region-specific. The papers in this volume represent research done not only in the CalCOFI region, but also the tropical, warm-temperate and high-latitude Northeast Pacific, temperate West Atlantic, Gulf of Mexico, tropical Southwest Atlantic, Southwest and Northwest Pacific, tropical and subtropical Central Pacific, and Red Sea.

The authors of the included papers range from some who worked closely with Geoff Moser during his career at the NOAA Southwest Fisheries Science Center in La Jolla, California, to those who were advised by him during their graduate studies, to some who were encouraged by him during their early "ontogeny" as larval-fish biologists, to those who knew him only through his publications. Most of the authors are based in the United States, but researchers from Australia, Brazil, Chile, France, Japan, and Mexico are also represented.

Similarly, this volume contains a wide range of research types, covering most subjects of interest to Geoff Moser. The only major research area of interest that is

missing concerns the direct applications to fisheries that he helped pioneer (Mundy et al., p. 3–19).

Descriptions of larval-fish morphological development were one of the primary research outputs of Geoff Moser's career. This kind of description is needed for many taxa of marine fishes from all regions. This volume contains descriptions of development of deep-sea cusk eels (Ophidiidae, Girard et al., p. 20–42), a coral-reef dottyback (Pseudochromidae, Leis and Galzin, p. 43–56), a New World silverside (Atherinopsidae, Dyer et al., p. 57–80), several gobies (Gobiidae, Saldierna-Martínez et al., p. 81–96), a triggerfish (Balistidae, Drass and Zapfe, p. 97–105), a seabass (subfamily Anthiinae, Konishi, p. 106–118), coral-reef butterflyfishes (Chaetodontidae, Schnell et al., p. 119–133), an armoreye dory (Zeniontidae, Konstantinidis et al., p. 134–142), and 2 rockfishes (Scorpaenidae, Charter et al., p. 143–154). The last is from Geoff Moser's former laboratory group and includes the description of the larval development of whitespotted rockfish (*Sebastes moseri*), a species named in his honor. Deary et al. (p. 155–166) review recent progress in larval-fish taxonomy in a broad range of taxa from the higher latitudes of the Northeast Pacific.

Several of the papers that describe larval development also use the characteristics of the larvae to hypothesize relationships, a research approach strongly advocated by Geoff Moser. This includes the studies on ophidiids (Girard et al.), anthiine serranids (Konishi), and atherinopsids (Dyer et al.). In addition, the phylogenetic study of the deep-sea dragonfishes (Stomiiformes, Smith et al., pages 167–184), a major mesopelagic taxon that was of particular interest to Geoff, provides an important

phylogenetic reanalysis and includes larval as well as adult morphology and genetic data.

A single paper examines larval-fish behavior, detailing the development of swimming ability of larvae and describing their morphological development (Leis and Galzin). This study is on a species of dottyback, a family of small predators that inhabit Indo-Pacific coral reefs.

One paper in the volume is a study of the vertical distribution of fish larvae (Bowlin et al., p. 185–201). This is a subject of intrinsic interest to larval-fish biologists and of great importance in planning surveys using towed nets and interpreting the associated data. Geoff Moser initiated this study, but he was unable to complete it before his retirement. However, in retirement, he advised the co-authors on the development of the project and reviewed an initial draft before his death. We are especially pleased to have in the collection a paper with such direct involvement by Geoff Moser; it is 1 of 2 written by members of his former laboratory group (the other is Charter et al.).

Geoff Moser strongly advocated the study of larval-fish assemblages, and this volume contains several studies included in that broad category. They include research on flatfish larvae of 7 families of the order Pleuronectiformes off the southeast coast of Australia (Miskiewicz et al., p. 202–207); the dominant larval-fish taxa of the York River estuary, a sub-estuary of Chesapeake Bay on the central east coast of the U.S. (Marin Martinez et al., p. 218–232); and the dominant larval-fish taxa of the central region of the Brazilian Exclusive Economic Zone in the tropical West Atlantic (Castro et al., p. 233–252).

Geoff Moser was particularly known for his research on myctophid (lanternfish) larvae, and that area of research is represented by 2 papers. Sassa et al. (p. 253–272) studied the species composition, distribution, and growth of larvae of a subgroup of the myctophid genus *Diaphus* in the poleward-flowing Kuroshio Current of Japanese waters. Myctophid larvae were also a dominant part of the catch in the study of vertical distribution of mesopelagic fish larvae by Bowlin et al.

Studying the dispersal of marine fish larvae introduced into open water as planktonic eggs or as recently hatched larvae is important for understanding population structure and dynamics and biogeography of the species. Dispersal is often at the core of what primarily occupies the attention and efforts of larval-fish biologists. Victor (p. 273–286) studied long-range dispersal of larval shorefishes captured hundreds of kilometers from possible sources. He used otolith ageing and DNA barcoding techniques to identify the larvae, their source, and their age. Interestingly, the larvae had been captured 30 years earlier over the Galapagos Ridge from the support ship of the research submersible *Alvin*, during the time between *Alvin* dives when the ship was otherwise unused for research.

When news of Geoff Moser's death on 30 September 2021 reached us, we were devastated. After the initial shock wore off, we tried to think of an appropriate way to honor his memory and research. We decided that putting together a collection of original, peer-reviewed research papers on marine fish early life-history and relationships would be a good way to do this. With the support of Geoff Moser's family, we sought the participation of larval-fish biologists world-wide to produce research papers within Geoff's area of interest. The present collection of 17 research papers is the result. It is a broad representation of Geoff's research interests and focus that demonstrates his continuing influence. (Many others wanted to participate, but were unable to for various reasons.) We thank the authors of these papers for their participation. We also thank the many peer reviewers listed below who ensured the quality that Geoff Moser would have expected. José Castro, Scientific Editor of NOAA Professional Papers NMFS, suggested the Professional Paper series as an appropriate venue for this collection of papers and reviewed each manuscript. NMFS Scientific Publications Office staff were very helpful in providing advice to both authors and guest editors, ensuring a quality publication.

## Manuscript reviewers for this volume

G. Aceves-Medina, S. Appelyard, G. Arratia, T. Auth, C. Baldwin, E. Bjorkstedt, S. Blum, B. Bowen, T. Clardy, K. Conway, A. Deary, J. Ditty, D. Drass, M. Fahay, J. Ferraz Dias, R. Funes-Rodriguez, A. Gill, M. Girard, T. Grande, A. Greer, S. Haddock, E. Hale, A. Harold, S. Herzka, B. Illing, G. Jenkins, P. Jimenéz-Rosenberg, C. Kenaley, D. Kobayashi, K. Marancik, A. Miskiewicz, M. Mojano, T. Moritz, J. Morson, B. Mundy, T. Nagasawa, F. Neira, P. Olivar, J. Rodriguez, K. Sakuma, C. Sassa, N. Schnell, D. Smith, S. Spoungle, C. Thacker, A. Thompson, T. Trnski, L. Vasquez, L. Vásquez-Yeomans, H. J. Walker, W. Watson, and G. Zapfe.

---

Final version published online 30 December 2024.

Cite as: Leis, J. M., W. Watson, B. C. Mundy, and P. Konstantinidis. 2024. Introduction. *In* Early Life History and Biology of Marine Fishes: Research inspired by the work of H Geoffrey Moser (J. M. Leis, W. Watson, B. C. Mundy, and P. Konstantinidis, guest eds.), p. 1-2. NOAA Professional Paper NMFS 24. <https://doi.org/10.7755/PP.24.1>