

Preface

Editing is the very edge of your knowledge forced to grow—a test you can't cheat on.—

S. Kelley Harrell

This book project grew out of our long-standing fascination with the amazing adaptive potential of many organisms, which enables them to survive some of the most extreme conditions found on Earth. For the last decade, our research has been dominated by our collaborative projects on livebearing fishes of the family Poeciliidae living in, and adapting to, extreme environmental conditions due to the presence of toxic hydrogen sulfide (H₂S) or the absence of light in subterranean habitats. Nonetheless, upon commencing the editing of this book, it became clear how little we actually knew about the biology of fishes in other types of extreme habitats, as well as about the biology of non-poeciliid fishes from sulfidic waters. Thus, editing this book became a humbling learning experience for us; something we are truly grateful for.

Extreme environments are abundant on Earth, and the scientific literature on extreme environmental conditions and how organisms deal with them have blossomed over the last few decades. In parts these efforts were driven by the desire to not only understand the limits within which life itself is possible but also to aid in our understanding of the physiological, ecological, and evolutionary responses to a more recent phenomenon that exacerbated existing and created novel extreme environments: human-induced environmental change. Teleost fishes in particular, with their high evolutionary potential (e.g., due to repeated genome duplications), are excellent models to delve into these questions, as many of them have adapted to environments usually considered inhospitable. However, books on extreme environments traditionally focused on microbes and invertebrates, while only few books to date have focused on extremophile teleosts. These books usually had more of a natural history rather than a conceptual approach to the topic (i.e., fewer habitat types were being covered and the focus was less on general evolutionary and ecological patterns). The implications of adaptation to extreme environments for the formation of new species (i.e., speciation), for example, have also not yet been covered. *Extremophile Fishes* tries to fill this gap.

However, when one of us (RR) was first approached by Springer in August of 2012 about the possibility of writing or editing a book on the adaptations of fishes to extreme environments, the first response was rather tentative. RR was just about to finish his first postdoctoral position at North Carolina State University, soon-to-be followed by a move to the University of Sheffield to begin a 3-year postdoctoral project working on chemical communication in stick insects. How much time would there really be over the coming years to devote to such an important project that focuses on fishes and not insects? Nevertheless, the opportunity was also too good to pass up on, because for the last decade we often complained (to one another as well as to other scientists) about the apparent lack of communication between scientists working in different biological specialty areas, which often seemed to result in each specialty group having to reinvent the wheel (e.g., cave biologists vs. “general” evolutionary ecologists). Since Springer was open to the option of having this become a multi-editor book, the project soon involved all three of us, and over the next few months we went to work drafting an outline for the book, and getting in touch with potential authors we considered the best choice for some of the individual chapters on fishes from specific types of extreme environments. The responses we got were so overwhelmingly positive that we decided to go ahead with this project despite some previous reservations, and so we submitted our project proposal to Springer, who officially approved the book concept by May of 2013. As a result, most authors had begun drafting their respective chapters by August of the same year.

First and foremost, we would therefore like to express our eternal gratitude and appreciation to all the authors for their excellent contributions, as well as all the external reviewers that kindly provided us with additional expert opinions and evaluations of the different chapters on top of our own assessments. All of them were a pleasure to work with, and they made our job as editors fairly easy by being very responsive to our every whim (please read: scientific enquiries, suggestions for revisions, tight deadlines, etc.), and by meeting all deadlines in a timely manner. In fact, the delays that inevitably happened during such a long-term project were usually the result of all three of us editors starting new positions during the 2 years of working on this book, rather than being the result of anything happening on the side of the authors or reviewers. It was their enthusiasm, dedication, and hard work for our project, which made the present book possible.

We also thank Ingo Schlupp (University of Oklahoma, OK, USA), who was the Ph.D. supervisor for two of us (RR and MT). He helped and guided us to find our respective scientific identities and facilitated a lot of the initial collaborative projects on poeciliids from extreme environments. Similarly, we thank Jakob Parzefall (professor emeritus and Ph.D. supervisor of MP at the University of Hamburg, Germany) for pioneering the research on the cave molly, and thus, providing a well-established starting point for our own investigations into the evolutionary ecology of the cave molly and other extremophile poeciliids. We further thank our various postdoctoral advisors who were instrumental in helping us grow as independent scientists and allowed us the freedom to pursue our own research on extremophile fishes in a collaborative fashion while being members of their research groups.

Specifically, RR would like to thank Brian Langerhans (North Carolina State University, NC, USA) and Patrik Nosil (University of Sheffield, UK), MT would like to thank Kirk Winemiller and Gil Rosenthal (both Texas A&M University, TX, USA), and MP would like to express his gratitude to Ralph Tiedemann (University of Potsdam, Germany) and Bruno Streit (JW Goethe University of Frankfurt, Germany). Furthermore, RR would like to thank Bernard Crespi (Simon Fraser University, Canada) for his valuable advice on book editing and handling contributing authors.

Moreover, we would like to thank the American Livebearers Association, the Erwin Riesch-Stiftung, the Freunde und Förderer der Goethe-Universität Frankfurt, the German Academic Exchange Service (DAAD), the German Ichthyological Society (GfI), the German Research Foundation (DFG), the Herrmann Willkomm-Stiftung, the Human Frontier Science Program (HFSP), the National Geographic Society, the National Science Foundation of the USA (NSF), and the Swiss National Science Foundation for financial support over many years. Our research was only possible due to the collaborative support and substantial help rendered by Lenin Arias-Rodriguez and Jeane R. Indy (both Villahermosa, Mexico), Francisco J. García de León (La Paz, Mexico), and Carlos Rodriguez Peña (Santo Domingo, Dominican Republic) as well as a large number of undergraduate, graduate, and postdoctoral researchers that have worked with us or circled through our labs over the years.

This book would have never reached fruition without the incredible help of the excellent people at Springer Verlag that helped, guided, and accommodated us along the way. We are grateful to Lars Koerner, who first approached us with the idea for this book, and who subsequently was of tremendous help in bringing the book from concept to reality. We are also indebted to Anette Lindqvist, the Project Coordinator for our book at Springer, in particular for her remarkable calm and accommodating responses during some of the inevitable problems we encountered during the writing and editing phases of the book. We also have to thank Murugesan Tamilselvan, our Production Editor, Sheik Mohideen, our Project Manager, and the countless others who worked behind the scenes, but who we never got to meet or interact with directly, for their tireless work and helpfulness during the design, production, advertising, and editing of the book.

Finally, we would like to thank our parents and partners, as well as our extended families and friends for their lifelong support and patience with us. They put up with us storing questionable things in the home fridge, being gone for extended field trips and conference visits, or simply disappearing for days behind our computer screens whenever we were trying to meet the next grant or scholarship deadline.

Our repeated thanks to all contributors, and we hope that the reader will find this book a valuable source of information.

London, UK
Manhattan, USA
Frankfurt a.M., Germany

Rudy Riesch
Michi Tobler
Martin Plath

Extremophile Fishes

Ecology, Evolution, and Physiology of Teleosts in
Extreme Environments

Riesch, R.; Tobler, M.; Plath, M. (Eds.)

2015, XII, 326 p. 30 illus., 16 illus. in color., Hardcover

ISBN: 978-3-319-13361-4