

***Fish Surviving in  
Extreme Conditions***

SYMPOSIUM PROCEEDINGS

**Dal Val**

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## PREFACE

Fish have colonized almost all aquatic environments on Earth, from deep oceans to tropical shallow hypoxic lakes. During this colonization process a myriad of adaptations have been developed. These adaptive responses occur at all biological levels and many are initiated as soon as the animal detects an environmental challenge. Indeed, the first adaptive response is behavioural, namely escape. However, even escape requires several physiological and biochemical adjustments. Such adjustments depend on both intensity and duration of the environmental perturbation imposed upon the individuals. If the perturbation persists, ecological and genetic responses follow the individual responses if there are sufficient survivors for natural selection to operate.

In addition to natural changes, fish are exposed to man made modifications to the environment that impose two different challenges to the animals: a) exacerbation of unfavourable natural conditions, and/or b) presence of new compounds in the aquatic environment. Adaptations the animals have developed during their evolution may suddenly play against them in these cases. For example, animals that developed aquatic surface respiration will be seriously affected by a xenobiotic concentrated on the top of the water column.

As an integrated system, fish depend on the environment for several activities: breathing, reproduction, eating, excreting, drinking, etc. The present symposium intends to gather researchers working on different aspects of environment-organic interactions for a variety of fish species living under extreme environmental conditions. Such an approach to adaptive biology involves many areas, which are represented here by a multidisciplinary series of papers. We hope these proceedings drive the readers and the symposium attendants through the various forms of adaptation shaped during the evolution of fish, and demonstrate the vulnerability of animals interacting with man made environmental changes.

Finally, we would like to take this opportunity to thank the participants of this symposium and the support all of us have had to produce the information presented here.

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Don MacKinlay  
Congress Chair

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