Editorial

At the interface of behaviour, ecology and evolution: Insights from the world of fishes

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We are pleased to present this special issue of Current Zoology entitled “Behaviour, Ecology and Evolution of Fishes”. The goal of this special issue is to showcase some of the recent developments in research occurring at the interface of fish behavioral ecology and evolution and to stimulate further research in this fascinating field. Most, but not all, of the papers fall under specific themes we identified in the call for submissions for this special issue. The issue features four review articles and fourteen original articles. The first review article, by I. Côté and S. Green, describes the potential interactions of climate change with invasive species using the invasive lionfish in the Caribbean as an example. J. Weis and A. Candelmo review the literature and describe recent experiments testing the effects of pollutants on fish behavior, using the mummichog and bluefish as the study organisms. Next, M. McPhee and colleagues develop an original theory proposing a common mechanism of parallel divergence in post-glacial fishes, a topic that dominates studies of the diversification and speciation of fishes. Finally, the review article by C Magnhagen focuses on the rapidly developing field of fish personality and examines how social context within groups of fishes affects individual personality.

Subsequent papers are organized according to four themes we identified in the initial call for papers. Continuing on the theme of fish personality, L. Stein and A. Bell present an analysis revealing consistent individual differences in fathering behavior of threespine stickleback. Working with the same species, J. Lacasse and N. Aubin-Horth describe consistent behavioral personality traits that co-vary with armor plating in ecologically divergent threespine stickleback populations.

Considering the amazing diversity of fish reproductive strategies, we also invited contributions on the theme of sexual selection and mating systems. A. Robart reports findings demonstrating that female convict cichlids increase their reproductive effort when paired with larger males. S. Archer and colleagues report dramatic changes in color patterns of a population of Nassau groupers in the days leading up to spawning and M. Ziege and colleagues report an audience effect on mating behaviors of the Atlantic molly. Finally, A. Habrun and G. Sancho describe differences among species in the duration of spawning assents of reef spawning fishes in pair spawners vs. group spawners.

Studies of animal movement have enjoyed a renaissance as the technology for tracking long-distance migrations in the wild has improved tremendously and represents the third theme of the special issue. P. Levin and colleagues combine acoustic tracking technology with mathematical modeling to describe the movement of the sixgill shark in the wild. The next two papers focus on schooling behavior. M. Larsson presents a conceptual model for how the evolution of sensory perception of individuals within groups lead to more synchronous schooling movements. T. Paciorek and S. McRobert describe the effects of photoperiod on the schooling behavior of zebrafish.

The fourth theme concerns the emerging field of ecological epigenetics. We present a single paper from B. Angers, a pioneer of this new field, and colleagues that describe naturally occurring populations of northern redbelly dace that harbor either native mitochondria or “cybrids” that have a similar nuclear genome, but mitochondrial DNA from a different but closely related species. The authors document the effects on methylation patterns as well as differences in the proteome.

We received four additional excellent submissions
that did not fit into the above themes but serve to illustrate the enormous diversity of studies conducted at the interface of fish behavioral ecology and evolution. First, S. Gray and colleagues demonstrate the effects of turbidity in behavior of African cichlids. Next, M. Boulet and colleagues describe preparatory transcriptomic changes in anadromous brook char for saltwater migration. Then, I. Kaatz and D. Sterart present a study of vocalizations and the incredible swim-bladder morphological diversity in neotropical catfishes. Finally, P. Park and colleagues demonstrate phenotypic plasticity in a brain feature of threespine stickleback.

We would like to acknowledge the Ecological and Evolutionary Ethology of Fishes (EEEF) organization, a group dedicated to the study of the ecology, evolution, behavior and conservation of fishes, for their role in initiating this special issue. Eight of the papers presented here were presentations in past bi-annual meetings of this organization, and several other papers are from supporters of the organization. We would like to thank Maria Abate, David Noakes, Lynda Corkum, Sigal Balshine, Astrid Kodrik-Brown, Gene Helfman, Felix Breden, John Reynolds, and Nick Dulvy for valuable support for this special issue. We also thank Zhi-Yun Jia, the Executive Editor for Current Zoology, for making this project possible.