
Cognitive evolution in the Anthropocene: Lessons from the Lionfish (*Pterois* spp.)

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With the emergence of the Anthropocene, a plethora of narrative has surfaced coupling human activities with deleterious cascade effects on different ecosystems and their associated wildlife. Altered habitats are thus becoming a persisting threat for many species. Coral reef ecosystems have long been thought to be exemplary habitats capturing how diverse life forms can be on the planet. However, in the past few decades coral reef ecosystems are becoming the focus of many studies that have identified major effects of anthropogenic threats on biological diversity. Reef habitats are affected severely by human induced modifications, such as physical destruction, sediment accumulation, nutrients runoff, pathogenic outbreaks, persistent organic pollutants, overfishing, ocean acidification, and coral bleaching. As a result, reefs are increasingly experiencing phase shift which is usually accompanied by a cascade effect in the ecosystem dynamics and the associated wildlife. This PhD project aims to adopt a multifaceted approach to identify and evaluate the impact of anthropogenic threats in the coastal ecosystem of the Red Sea not only from an ecological and behavioural angle but also from evolutionary and socio-economic angle. To do so, Lionfish will be used as a research model, which is commonly found in coral reef ecosystems and plays a role in shaping the associated community structure, as it changes along with human induced disturbances. At first, the effect of human-induced alterations on reef community structures, specifically Lionfish spp. will be assessed. Then the role of novel environments on both the Lionfish behavioural responses as well as their adaptive plasticity will be assessed. Lastly, the socio-economic implications of human-induced environmental changes will be addressed.