

Hybrid a Salt: Genomic investigation of salinity tolerance as an adaptive phenotype in *Crocodylus acutus* x *C. moreletii* hybrids in Belize and its conservation conundrum

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Abstract: Incorporating alleles from one species into the gene pool of a second – or introgressive hybridization – is a subject of controversy due to its constructive and destructive force. It can enhance adaptability and facilitate rapid radiation by introducing genetic variation, but it can also drive rare taxa to extinction through loss of local adaptation or genetic swamping. While natural hybridization is a known evolutionary process, anthropogenically induced hybridization has been established as a threat to biodiversity. High levels of introgression between the saltwater-adapted American crocodile (*Crocodylus acutus*) and freshwater-adapted Morelet’s crocodile (*Crocodylus moreletii*) have been recorded in sympatric areas throughout Central America, revealing evidence of multigenerational hybrids across the Gulf of Mexico and parts of the Caribbean. While this hybridization has been established as an ancient process, anthropogenic impact has been proposed to be speeding up and spreading the hybrid boundaries beyond historical hybrid zones and farther than the boundaries of any one species. In Belize, escalating reports of hybridization has raised concerns among conservation stakeholders regarding the preservation of each species’ genetic integrity. With both species being listed as highly threatened in Belize, decreased protection due to ambiguous conservation laws for hybrids increase the vulnerability of both the animals and their environment. The goal of my study is to investigate what may be facilitating this hybridization in order to understand its evolution and conservation implications. Using a genome-wide association study, I aim to conduct a population genomic analyses to reconstruct the magnitude and timing of introgression, as well as to identify potentially adaptive phenotypes exhibited from introgressed genomes – particularly involving salinity tolerance. In preliminary analyses, significant differences were found in environmental salinities taken at capture locations across Belize between morphologically distinguishable *C. acutus* and *C. moreletii*, and between *C. moreletii* and putative hybrids.

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