

Screening for evidence of hybridization and assessing genetic structure and relatedness of Morelet's crocodiles (*Crocodylus moreletii*) across the region of Calakmul (Campeche, Mexico)

José António Lemos Barão-Nóbrega^{1,2}, Mauricio González-Jáuregui³, Kathryn Maher⁴, Sergio E. Padilla-Paz³, Arely Martínez-Arce⁵, José Rogelio Cedeño-Vázquez⁵, Pierre Charruau⁶, and Robert Jehle² (STUDENT)

¹Operation Wallacea, Wallace House, Old Bolingbroke PE23 4EX, UK (jose.antonio@opwall.com)
²School of Environment and Life Sciences - University of Salford, Greater Manchester M5 4WT, UK (r.jehle@salford.ac.uk); ³Centro CEDESU - Universidad Autónoma de Campeche, 480 Av. Heroes de Nacozari – 24079, Campeche, Mexico (mauglezj@gmail.com; sepadill@uacam.mx); ⁴NERC Biomolecular Analysis Facility – University of Sheffield, Sheffield, S10 2TN, UK (kathryn.maher@sheffield.ac.uk); ⁵El Colegio de la Frontera Sur, Av. Centenario Km 5.5 – 77014, Chetumal, Mexico (arelymararel@gmail.com; rogeliocedeno@gmail.com); ⁶Centro del Cambio Global y la Sustentabilidad A.C., CP 86080, Villahermosa, Tabasco, Mexico (charruau_pierre@yahoo.fr).

Abstract: Knowledge on population genetics in crocodylian species has increased significantly over the last decades. Hybridization between the American crocodile (*Crocodylus acutus*) and the Morelet's crocodile (*Crocodylus moreletii*) has been reported in coastal regions of sympatry and at inland sites outside the distribution range of *C. acutus*. As such, populations routinely identified as *C. moreletii* in Mexico are very likely to be admixed (Pacheco-Sierra et al. 2016, 2018). In the region of Calakmul (Campeche, Mexico), *C. moreletii* inhabits semi-temporary and therefore highly dynamic natural ponds (aguadas) sustained by rainfall. Due to the geography of the region, reduced gene flow between localities may have led to a spatial population structure linked to family relationships, which is different from other studied populations in the Yucatan Peninsula. We evaluated genetic structuring and presence of individuals exhibiting genomic admixture between *C. acutus* and *C. moreletii* in Calakmul using four mitochondrial and approximately 5000 nuclear DNA markers (SNPs) from 95 crocodile samples. Our results show that putative *C. acutus*-specific alleles were detected in only 5-10% of our samples (and generally at low frequencies for nuclear markers), distributed amongst a small number of locations. Observed admixture proportions suggest a scenario of ancient admixture and/or incomplete lineage sorting rather than contemporary hybridisation. Our data also reveals some genetic differentiation and geographic structuring within Calakmul (F_{ST} range: 0.05–0.16). Very few nonadmixed *C. moreletii* populations seem to still exist in the wild, and until this study none have been previously detected in the Yucatan Peninsula. Overall, our study highlights the conservation importance of *C. moreletii* populations in aguadas environments.

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