

## **Crocodylian conservation and evolution insights from an anatomical and histological examination of phalli from male false gharial (*Tomistoma schlegelii*)**

### **ABSTRACT**

As wild population threats for the endangered false gharial (*Tomistoma schlegelii*) persist, conservation breeding programs, including developing semen collection techniques for subsequent artificial insemination, are becoming important species conservation measures. Developing reproductive biology understanding of a species is important to developing best practices and hopefully maximizing reproductive successes. However, information on crocodylians functional copulatory anatomy in general is lacking. To that end, zoological facilities and conservation centres have the exceptional opportunity to contribute new understandings that may not otherwise be attainable regarding crocodylian reproductive anatomy, particularly during routine physical examinations or post-mortem necropsies. Therefore, to better understand *T. schlegelii* reproductive biology, to contribute knowledge in support of zoo breeding conservation efforts and to contribute to what is known overall about crocodylian reproduction, we investigated phallic anatomy of adult male *Tomistoma* from two zoological populations, the St. Louis Zoo, USA and Sungai Dusun Wildlife Reserve, Peninsular Malaysia. Here, we present the gross anatomical features and histological analysis of underlying tissue-level details in pursuit of a better understanding of copulatory function and associated gamete transfer mechanisms. While much of the overall *Tomistoma* phallic morphology and inferred function corresponds to that of other crocodylian species and speaks to conserved aspects of functional anatomy across taxa, species-specific aspects of glans and glans tip morphology are also identified. These novelties are discussed in a general function and overall broader evolutionary contexts.

**Keyword:** Copulation; Crocodylian; Glans; Reproduction; Zoo