

# A Taphonomic Study of *Crocodylus porosus* (Crocodylidae) and *Tomistoma schlegelii* (Gavialidae) Remains from Western Sarawak, Malaysian Borneo: Applications for Public Education

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## ABSTRACT

This study documented details of the dentitions, skulls and other skeletal remains of *Crocodylus porosus* and *Tomistoma schlegelii*, from western part of Sarawak, Malaysian Borneo. The remains of both reptiles were exhumed, followed by standard cleaning procedures and then detail morphological assessments were carried out accordingly. Both species show similar structure of vertebral columns, but *T. schlegelii* has the following unique structures: a long and narrower snout, D-shaped eye sockets, long and sharp pointed protruding quadratojugal bones, straight maxillae and dentary, a smooth surfaced skull, elongated triangular suborbital fenestrae, round shaped internal nares and visible supraoccipital from a dorsal view. *C. porosus* has heterodont dentition with blunt-pointed and irregular size of teeth whereas *T. schlegelii* has almost homodont dentition with sharp and similar size teeth. This is the first collection of teeth, skulls and other skeletal remains of both species obtained from Sarawak, and the materials have been used regularly to educate the public through science exhibitions, hoping they will spark the interests of young budding scientists to be involved in wildlife taphonomic studies in the future.

Keywords: *Crocodylus porosus*, dentition, reptile, skeletal remain, *Tomistoma schlegelii*

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## INTRODUCTION

The saltwater crocodile, *Crocodylus porosus* has a wide distribution, ranging from Australia, Bangladesh, Brunei, Myanmar, Timor Leste (East Timor), India (including Andaman and Nicobar Islands), Indonesia, Malaysia, Palau, Papua New Guinea (including Bismark archipelago and other island chains), the Philippines, Sri Lanka and Solomon Islands (Britton, 2012). *C. porosus* (locally name: “Buaya Katak” or “Buaya Air Masin”) and *Tomistoma schlegelii* (local name: “Buaya Jejulong”) are found in Sarawak (Hassan *et al.*, 2016; Stuebing, Bezuijen, Auliya & Voris, 2006). Previously, both *C. porosus* and *T. schlegelii* were in the same family namely Family Crocodylidae but later evidence from nuclear gene inferences had placed *T. schlegelii* into Family Gavialidae (Willis, McAliley, Neely, & Densmore, 2007). In Sarawak, the existence of *T. schlegelii* is less known compared to *C. porosus*, probably due to the secretive nature of the latter species (Hassan *et al.*, 2016). The distribution of *T. schlegelii* is limited to the lowland regions of western Sumatra, Kalimantan and western Java (Indonesia), Sarawak and Peninsular Malaysia. *T. schlegelii* is classified in Appendix I of the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES) (Bezuijen, Shwedick, Sommerlad, Stevenson & Stuebing, 2010; Webb, Manolis & Brien, 2010). For *C. porosus* in Sarawak, various conservation efforts, including strict law enforcement, had been successful, leading to the increased in populations over the 30-years period as reflected in the state crocodile surveys involving all 21 river basins (Zaini, Ripot, Ubang, Francis & Simon, 2014). In 2016, Sarawak has been successful in transferring *C. porosus* from Appendix I to Appendix II of CITES, providing opportunity for sustainable management of the wild resource for the benefit of local people. The documentation on the density and ecology of *C. porosus* in Sarawak had been carried out by Bezuijen *et al.* (2010), Cox and Gombek (1985), Gani (2014), Gani and Hassan (2013), Hassan and Gani (2013), Hassan, Adzhar, Gani and Ahmad (2018) as well as Zaini *et al.* (2014). Research on *T. schlegelii* in Sarawak could be referred to Bezuijen, Shwedick, Simpson and Stuebing (2014), Cox and Gombek (1985), Hassan *et al.* (2016), Md Adzhar and Hassan (2017), Pine (2013), Stuebing, Sah, Lading and Jong (2003) and Stuebing *et al.* (2006).