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Sea snakes in Australian waters (Serpentes: subfamilies Hydrophiinae and Laticaudinae)—a review with an updated identification key

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Abstract

Sea snakes (Elapidae, subfamilies Hydrophiinae and Laticaudinae) reach high species richness in the South China Sea and in the Australian region; however, most countries in the two regions still lack up-to-date checklists and identification tools for these snakes. We present an updated reviewed checklist and a new complete identification key to sea snakes in Australian waters. The identification key includes 29 species documented and 4 possibly occurring taxa and is based mostly on easy-to-use external characters. We find no evidence for breeding populations of *Laticauda* in Australian waters, but include the genus on the list of possibly occurring taxa.

Key words: biodiversity, Australian sea snake species, identification key

Introduction

Globally there are some 70 species of sea snake (aquatic elapids, in the subfamilies Hydrophiinae and Laticaudinae), found in tropical and subtropical waters of the Indian Ocean and the Pacific Ocean, from the east coast of Africa in the west to the Gulf of Panama in the east (David & Ineich, 1999; Rasmussen, Murphy, Ompi, Gibbons, & Uetz, 2011). Most species occur in the Indo-Malayan Archipelago, the China Sea, Indonesia, and the Australian region (Cogger, 1975; David & Ineich, 1999; Golay *et al.*, 1993; Guinea & Whiting, 2005; Ineich, 2007; Khan, 2004; Kharin, 2005; Kharin & Czeblukov, 2009; Rasmussen, 2000; Rasmussen, Elmberg, Gravlund, & Ineich, 2011; Rasmussen, Murphy, *et al.*, 2011; M. A. Smith, 1926).

The viviparous sea snakes (Hydrophiinae) originated in Australia, having descended from the country's endemic front-fanged terrestrial hydrophiine snakes (Lukoschek & Keogh, 2006; Sanders, Lee, Leys, Foster, & Keogh, 2008). The group has since radiated in shallow water marine habitats throughout the Indo-Pacific, with 62 recognised species in 7 genera (Sanders, Lee, Mumpuni, Bertozzi, & Rasmussen, 2013). However, Australia supports the world's highest recorded diversity and endemism, with more than 35% of the described viviparous sea snake species recorded from its waters and five nationally endemic species: *Aipysurus apraefrontalis*, *A. foliosquama*, *A. fuscus*, *Ephalophis greyae*, and *Hydrophis donaldi* (Cogger, 1975; Elfes *et al.*, 2013; Guinea & Whiting, 2005; Lukoschek, Beger, Ceccarelli, Richards, & Pratchett, 2013; Sanders, Rasmussen, & Guinea, 2014; M. A. Smith, 1926).

Over the last 50 years 8 new species have been described from or adjacent to Australian waters, but large areas still remain much understudied (Cogger, 1975; Cogger & Heatwole, 2006; Heatwole, Busack, & Cogger, 2005; Kharin, 1983, 1984a, 1984b, 1985; Rasmussen & Ineich, 2000; Sanders *et al.*, 2012; L. A. Smith, 1974; Ukuwela, Sanders, & Fry, 2012). The addition of further species must be expected as the geographical ranges of existing

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