



A new subspecies of *Batagur affinis* (Cantor, 1847), one of the world's most critically endangered chelonians (Testudines: Geoemydidae)

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Abstract

Estuarine *Batagur* are among the most critically endangered chelonian species. We assess the taxonomic status of the recently discovered Cambodian relic population of *Batagur* by phylogenetic analyses of three mitochondrial (2096 bp) and three nuclear DNA fragments (1909 bp) using sequences from all other *Batagur* species and selected allied geoemydids. Furthermore, we calculated haplotype networks of the mitochondrial cytochrome *b* gene for Cambodian terrapins, *B. affinis*, *B. baska*, and *B. kachuga* and compare external morphology of estuarine *Batagur* populations. Genetically, Cambodian *Batagur* are closely related with, but distinct from *B. affinis* from Sumatra and the west coast of the Malay Peninsula. Morphologically, Cambodian *Batagur* resemble the distinctive *B. affinis* populations from the eastern Malay Peninsula that were not available for genetic study. We suggest that the *Batagur* populations from the eastern Malay Peninsula and Cambodia represent a new subspecies of *B. affinis* that once was distributed in estuaries surrounding the Gulf of Thailand (*Batagur affinis edwardmolli* subsp. nov.). Its patchy extant distribution is most probably the result of large-scale habitat alteration and century-long overexploitation. In addition, our phylogenetic analyses suggest repeated switches between riverine and estuarine habitats during the evolution of the extant *Batagur* species.

Key words: Southeast Asia, South Asia, *Batagur affinis affinis*, *Batagur affinis edwardmolli* subsp. nov., *Batagur baska*, *Batagur kachuga*, endangered species

Introduction

Batagur baska (Gray, 1830) is one of the world's most critically endangered terrapins. Its range was recently restricted to a region extending from coastal north-easternmost India and adjacent Bangladesh southwards to at least the Ayeyarwady and Bago estuaries in Myanmar (Praschag *et al.* 2007, 2008). Populations from the Malay Peninsula and Sumatra, traditionally treated as conspecific, turned out to represent the distinct species *B. affinis* (Cantor, 1847). Both *B. affinis* and *B. baska* are large terrapin species, reaching a maximum shell length of approximately 60 cm (Moll 1980; Ernst *et al.* 2000). Their distribution is more or less confined to brackish water; they occur in estuaries, mangrove belts and inshore beds of marine vegetation (Kalyar *et al.* 2007). Phylogenetically, *B. affinis* and *B. baska* together are sister to a riverine inland species, *B. kachuga* (Gray, 1831) from northern India (Praschag *et al.* 2007), that was placed for a long time in the genus *Kachuga* (Le *et al.* 2007; Praschag *et al.* 2007).

Batagur affinis and *B. baska* declined dramatically throughout their ranges as a result of overharvesting of adults and eggs coupled with habitat degradation (Das 1997; Moll 1997; Kalyar *et al.* 2007; Platt *et al.* 2008). Estuarine *Batagur* once also occurred in southern Vietnam and Cambodia, but until now, nothing has been