



## Systematics of the caecilian family Chikilidae (Amphibia: Gymnophiona) with the description of three new species of *Chikila* from northeast India

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### Abstract

A taxonomic review of the monogeneric northeast Indian caecilian family Chikilidae is presented based on 64 specimens. *Chikila fulleri* (Alcock, 1904), known previously only from a single specimen collected more than 100 years ago, is re-diagnosed and characterised based on recent collections. We describe three additional species new to science, *Chikila alcocki* sp. nov., *Chikila darlong* sp. nov., and *Chikila gaiduwani* sp. nov. This species-level taxonomy is consistent with mitochondrial DNA sequence data. A key to the species of *Chikila* is presented.

**Key words:** DNA, herpetology, identification key, morphology, taxonomy

### Introduction

India is a global hotspot of amphibian diversity (Biju & Bossuyt 2003; Bossuyt & Milinkovitch 2001), with more endemic amphibian families than any other country (Kamei *et al.* 2012). Taking into account a recent proposed synonymy (Gower *et al.* 2013), the Indian caecilian fauna includes 35 nominal endemic species making it a global centre of caecilian diversity with ca. 18 % of all caecilian species. Most Indian caecilian diversity has so far been documented from the Western Ghats region of the peninsula, with less work having been conducted on the caecilian fauna of the northeast, India's other major centre of amphibian diversity (Inger & Dutta 1986; Biju 2001). Northeast India has two families of caecilians, the endemic Chikilidae and more widespread Ichthyophiidae. The vast majority of previous work on the region's caecilian fauna has been taxonomic and focused on species of the ichthyophiid *Ichthyophis* (Taylor 1960, 1968; Pillai & Ravichandran 1999; Kamei *et al.* 2009; Mathew & Sen 2009). Prior to 2012, the only non-ichthyophiid caecilian record for northeast India was the unique holotype specimen of *Herpele fulleri* Alcock, 1904. Taylor (1968) transferred Alcock's species to the genus *Gegeneophis* Peters, 1880, known otherwise only from the Western Ghats of peninsular India (Gower *et al.* 2011). Recently, Kamei *et al.* (2012) reported upon extensive surveys across northeast India in which additional specimens of this species and specimens of congeners were found that, based on mitochondrial DNA sequence data, were considered to represent multiple distinct, unnamed species. Furthermore, Kamei *et al.* (2012) demonstrated that these northeast Indian caecilians are more closely related to the African family Herpelidae (their sister group) than to the peninsular Indian *Gegeneophis*, and they established a new genus (*Chikila*) and family (Chikilidae) for the newly discovered radiation. Here we review the taxonomy of Chikilidae using morphology to complement Kamei *et al.*'s (2012) DNA sequence data. We re-diagnose *Chikila fulleri* (Alcock, 1904), describe three new species of *Chikila*, and provide a key to the species of the genus.

### Materials and Methods

**Field survey and specimen collection** (Figure 1, Table 1). Specimens were collected in the daytime by digging soil to a depth of up to ca. 30–45 cm generally in marshy areas or habitats close to water sources such as perennial