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# A new genus and species of cryptic Asian green pitviper (Serpentes: Viperidae: Crotalinae) from southwest China

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## Abstract

A new genus and species of Asian green pitviper is described from Southwest China based on two female specimens. A new DNA phylogeny recovers the two specimens of the new species as a well-supported clade that is sister group to all sampled representatives of the genera *Viridovipera* and *Cryptelytrops*. The new genus is distinguished from other pitviper genera by a combination of morphological characters, including the absence of a lateral stripe, large body size, and deep red eye in adult females. Morphologically the new species is superficially most similar to species of *Popeia* in body dimension and scalation, but is genetically extremely distinct. The new genus/species is currently known only from south Sichuan, where it was found at about 1000 m above sea level in less disturbed evergreen rainforest.

**Key words:** southeast Asia, DNA, phylogeny, snakes, taxonomy

## Introduction

One of the key tasks in systematics is to identify and describe new taxa, infer their systematic position, and explore their relationships with related taxa. The Asian pitvipers of the genus *Trimeresurus* (*sensu lato*) (see definition in Gumprecht *et al*. 2004), which occur throughout southern and southeastern Asia (Malhotra & Thorpe 2004; Gumprecht *et al*. 2004), comprise about 40 species (David & Ineich 1999; McDiarmid *et al*. 1999; Gumprecht *et al*. 2004; Vogel 2006). In recent years, ongoing studies have revealed high levels of specific diversity (e.g. David *et al*. 2001, 2002; Orlov *et al*. 2004; Vogel *et al*. 2004; Grismer *et al*. 2006, 2008). However, this group is characterized by extraordinary morphological conservativeness, and thus is extremely prone to species misidentification (Malhotra & Thorpe 2000; Giannasi *et al*. 2001; Tillack *et al*. 2003), and determination of systematic relationships among taxa is extremely challenging if based solely on morphological data. Recent molecular phylogenetic studies involving high levels of sampling across most Asian pitvipers have led to radical reorganization of the genus *Trimeresurus* (*sensu lato*) (Gumprecht *et al*. 2004) and uncovered many historically misaligned species (e.g. Herrmann *et al*. 2004; Dawson *et al*. 2008). The potential presence of still unrecognized cryptic species within Asian pitvipers impinges upon our ability to understand the evolution of current patterns of diversity in this group.

In 2003, a female green pit viper was collected in Hejiang County, south Sichuan, China (Fig.1). This specimen was identified initially as *Trimeresurus albolabris* (= *Cryptelytrops albolabris*) by Zhao (2006: 140). However, a subsequent molecular analysis and investigation of morphological characters revealed that this specimen was not closely related to *C. albolabris* (unpublished data). In 2007, another female was collected in the same locality. The collection of two specimens allows us to further study them on the basis of morphological comparison and molecular phylogeny. Here, based on a combination of phylogenetic analysis of mitochondrial DNA sequences and morphological comparison between these two specimens and related species, we explore the relationship of these two unidentified individuals to other Asian pitvipers previously assigned to the genus *Trimeresurus* (*sensu lato*) (Gumprecht *et al*. 2004). We consider them to belong to a cryptic taxon which is here described as a new species and genus.

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