



Revision of the *Tropidolaemus wagleri*-complex (Serpentes: Viperidae: Crotalinae). I. Definition of included taxa and redescription of *Tropidolaemus wagleri* (Boie, 1827)

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ABSTRACT

In this first paper of a series of three, the taxonomy of the Asian pitvipers of the genus *Tropidolaemus* is re-evaluated on the basis of morphological analyses. Variation in morphological characters was investigated on the basis of specimens from the whole range of the pitviper currently known as *Tropidolaemus wagleri* (Boie, 1827). Our results, based on morphological univariate and multivariate analyses, define three clusters of populations that are morphologically diagnosable and which are here considered to represent distinct species following the Biological Species Concept and the Phylogenetic Species Concept. After a review of available names among the list of synonyms created during the confused taxonomical history of the genus *Tropidolaemus*, it appears that *Tropidolaemus wagleri* (Boie, 1827) is the valid name of the first cluster which includes populations inhabiting Southern Thailand, West Malaysia, Sumatra, Nias, Mentawai Archipelago and Bangka Island (but not Belitung). In order to stabilize the binomen, we select and describe a neotype for *Tropidolaemus wagleri*. A second cluster, for which the binomen *Tropidolaemus subannulatus* (Gray, 1842) is

available, includes in this preliminary step populations from Borneo, Sulawesi, Sulu Archipelago and the Philippines. Its detailed taxonomy will be addressed in the second paper of the series. Lastly, the third cluster includes specimens from Mindanao Island, Philippines, recognized here as *Tropidolaemus philippensis* (Gray, 1842).

KEY WORDS: Indonesia, Thailand, West Malaysia, Sumatra, Borneo, Sulawesi, Philippines, Serpentes, Viperidae, *Tropidolaemus*, *Tropidolaemus wagleri*, *Tropidolaemus subannulatus*, *Tropidolaemus philippensis*, *Tropidolaemus laticinctus*, *Tropidolaemus huttoni*, taxonomy, neotype

INTRODUCTION

Among pitvipers of tropical Asia, members of the genus *Tropidolaemus* Wagler, 1830 are among the most widespread and often commonly encountered venomous snakes in many islands of the Indo-Malayan Archipelago. Long regarded as a synonym or a subgenus of *Trimeresurus* (see, for example, Brattstrom, 1964), the genus *Tropidolaemus* was resurrected by Burger (1971) to then accommodate the sole species formerly called *Trimeresurus wagleri*. The validity of the genus is accepted by all recent authors. This genus is characterized by the absence of a nasal pore, upper surfaces of the snout and head covered with distinctly keeled small scales, strongly keeled gular scales, second supralabial not bordering the anterior margin of the loreal pit and topped by a prefoveal, and a green coloration in juveniles which may or may not change with growth. For long, *Tropidolaemus wagleri* was the sole species included in the monotypic genus, but David & Vogel (1998) showed that the Indian species *Trimeresurus huttoni* Smith, 1949 was clearly a member of this genus.

In this first paper of a series of three, we address the rather confused nomenclatural history and taxonomy of *Tropidolaemus wagleri* (Boie, 1827) *sensu auctorum* (see, for example, David & Ineich, 1999; McDiarmid et al., 1999; Gumprecht et al., 2004). Members of this species complex are widespread throughout the Indo-Malayan part of Asia, with an isolated population in Southern Vietnam. Besides this latter country, it is distributed from southern Thailand to the Philippines and Sulawesi Island, including West Malaysia, and the islands of Sumatra, Borneo, Bangka, Nias, the Mentawai Archipelago, and Belitung. Although a common and conspicuous, very variable species, few authors tried to investigate its taxonomy, most probably following Boulenger (1896) who synonymised the various names under the sole specific name *Lachesis wagleri*. Nevertheless, Taylor (1917, 1922) examined Philippine populations and recognized three subspecies, of which two were considered endemic to the Philippine islands, *Tropidolaemus wagleri alboviridis* (Taylor, 1917) and *T. wagleri subannulatus* (Gray, 1842). This position was not accepted by Leviton (1964), who investigated the taxonomy of the Philippine populations and considered again *Tropidolaemus wagleri* to be monotypic. However, Leviton added: "The exact status of the nominal species and subspecies I have placed into the synonymy of *T. wagleri* cannot be settled until the type specimens and additional material from scattered localities can be examined."

The monotypic status of *Tropidolaemus wagleri* was accepted by subsequent authors (Harding & Welch, 1980; Hoge & Romano-Hoge, 1981; Alcalá, 1986; Welch, 1988; Golay et al., 1993; David & Vogel, 1996; Manthey & Grossmann, 1997; McDiarmid et al., 1999), although some noted that the taxonomy of the species was unsatisfactory (David & Ineich, 1999). David & Vogel (1998) discussed the taxon described as *Trimeresurus philippensis* Gray, 1842, regarded as valid by Taylor (1922) and Maslin (1942) as *Trimeresurus philippensis*, but placed in the synonymy of *Tropidolaemus wagleri* by Leviton (1964), who, however, seemingly did not examine its holotype. David & Vogel (1998) examined two specimens, namely the holotypes of *Trimeresurus philippensis* Gray, 1842 and *Tropidolaemus hombronii* Jacquinet & Guichenot, 1848, clearly a synonym of the former one. David & Vogel (1998) and David & Ineich (1999) noted that both specimens displayed notable morphological differences (sculptation of head and body and coloration) with *Tropidolaemus wagleri*.