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# Revision of the Western Australian pebble-mimic dragon species-group (*Tympanocryptis cephalus*: Reptilia: Agamidae)

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## Abstract

Recent work on species complexes of the pebble-mimic dragons of the Australian genus *Tympanocryptis* has greatly clarified evolutionary relationships among taxa and also indicated that species diversity has been severely underestimated. Here we provide a morphological and molecular appraisal of variation in the *T. cephalus* species-group and find evidence for recognizing five species-level lineages from Western Australia. Four species-level lineages are strongly supported with a combined mitochondrial and nuclear DNA Bayesian analysis (a fifth population from the Gascoyne region lacked tissue samples). Morphologically, we found subtle, yet consistent, differences among the populations in scalation, color and pattern. True *T. cephalus* Günther is restricted to the coastal Pilbara region and characterized by five dark blotches on the dorsum, keeled ventrals, and other characters. Two other lineages within the Pilbara, from the Hamersley range and Fortescue/northern Pilbara region, differed from *T. cephalus senso stricto* by possessing a more elongate body and a plain dorsum. Furthermore, the Hamersley lineage differed from the Fortescue lineage by possessing slightly more reddish coloration and feeble keeling on the snout. Although there are few specimens and no tissue samples available for the Gascoyne population, these individuals are larger, have rugose scales on the snout, and possess scattered enlarged tubercles with three large blotches on the dorsum. The name *T. cephalus gigas* Mitchell is available for this population. The most widespread lineage, and the one best represented in collections and in field guides, occurs throughout central Western Australia. These Goldfield populations are characterized by a protruding snout, narrow rostral, and uniform reddish-brown coloration, often with a dark wash. Based on the genetic and morphological differences, we redescribe *T. cephalus*, resurrect and elevate *T. gigas* to a full species and designate a neotype for this taxon, and describe three lineages as new species (*T. diabolicus* **sp. nov.**, *T. fortescuensis* **sp. nov.**, *T. pseudopsephos* **sp. nov.**).

**Key words:** agamid lizard, cryptic species, Gascoyne, morphology, mtDNA, nDNA, neotype, Pilbara, taxonomy, *Tympanocryptis diabolicus* **sp. nov.**, *Tympanocryptis fortescuensis* **sp. nov.**, *Tympanocryptis gigas*, *Tympanocryptis pseudopsephos* **sp. nov.**

## Introduction

Lizards of the Australian genus *Tympanocryptis* Peters, 1864 are highly cryptic, with complex patterns on the body similar to the backgrounds on which they occur, and a tendency to remain motionless when predators approach. There are 11 species currently recognized (Melville *et al.* 2014). Most are small (~50 mm snout-vent length [SVL]), with a stout body, short round head, and short thin tail. Some have adopted extreme 'pebble-mimicking' camouflage, with the head and body resembling a small and large stone, with a gray tail that resembles a twig (Pianka & Vitt 2003, p. 68; Wilson 2012, p. 96).

Recently, Shoo *et al.* (2008) conducted a phylogenetic study of the genus, focusing on arid zone pebble-mimic forms. They found that *T. cephalus* Günther, 1867 was restricted to Western Australia, as the type location is near Karratha in the Pilbara region. They also found that populations previously assigned to *T. cephalus* from the Northern Territory, South Australia and Queensland (Houston & Hutchinson 1998; Wilson & Swan 2003) were not

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