



## A phylogeny of the enigmatic Madagascan geckos of the genus *Uroplatus* (Squamata: Gekkonidae)

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### Abstract

Since its discovery in the 17th century, the morphological peculiarities of the gekkonid lizard genus *Uroplatus* have generated a great deal of attention. A large number of skeletal, integumentary and visceral features are autapomorphic for the genus and some of the more well-known members of the group possess such aberrant characteristics that a separate family was once recognized to accommodate them. Recent phylogenetic analyses confirm that *Uroplatus* is a typical gekkonid gecko, but the specific affinities of the genus, as well as its intrageneric relationships have remained unresolved. Both nuclear (RAG-1 and PDC) and mitochondrial (ND2 and *cyt b*) genes (~3.2 Kb) were sequenced for 10 of 13 recognized species of *Uroplatus*, as well as two Madagascan and mainland African outgroups. The large-bodied forms of *Uroplatus* (*U. fimbriatus*, *U. giganteus*, *U. henkeli*, and *U. sikorae*) form a monophyletic group, and the small-bodied, short-tailed species are also monophyletic (*U. ebenau*i and *U. phantasticus*). *Uroplatus alluaudi* + *U. pietschmanni* comprise another distinct clade, whereas *U. lineatus* was weakly supported as the sister taxon of the large-bodied clade and *U. guentheri* was sister to all other members of the genus. Our phylogenetic hypothesis based on combined DNA sequence data is mostly congruent with previous hypotheses based on morphological data. Based on a larger, more inclusive dataset, the closest relatives of *Uroplatus* are mainland African *Afrogecko* and Madagascan *Matoatoa*, suggesting that the diverse Malagasy gecko fauna does not comprise a single evolutionary lineage. A high diversity of new taxa (either representing synonyms to resurrect or undescribed species), morphologically similar either to *U. ebenau*i/*phantasticus* or to *U. henkeli/sikorae*, was apparent from our data. Many of these genetically highly divergent lineages originated from localities in northern Madagascar, which indicates this region as the possible center of diversity and endemism for several subgroups of *Uroplatus*.

**Key words:** *Uroplatus*, Gekkonidae, Madagascar, molecular phylogeny, phosducin, systematics

### Introduction

Lizards of the genus *Uroplatus* are among the most morphologically distinctive of all geckos and are perhaps, next to chameleons, the most widely recognized of the endemic lizard radiations of Madagascar. Larger species of *Uroplatus* are distinguished among geckos in having the largest number of marginal teeth (highest among all living amniotes), and other rare apomorphic character states within the Gekkota include multiple inscriptional ribs, restriction of autotomy planes, and finger-like diverticula of the lungs (Siebenrock 1893; Werner 1912; Bauer and Russell 1989). Numerous uniquely derived features, such as basal paraphalanges that are associated with the control and support of the extensive interdigital webbing (Russell and Bauer 1988) and a diversity of features of the laryngeotracheal system (Tiedemann 1818; Meckel 1819; Rittenhouse *et al.*