



Revision of the little brown frogs in the *Gephyromantis decaryi* complex with description of a new species

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Abstract

We revise the systematics of a group of little brown leaf litter frogs from Madagascar that are notoriously difficult to diagnose, the *Gephyromantis decaryi* complex. Using an integrative combination of molecular data, bioacoustics, and morphology, we reveal four divergent evolutionary lineages which all are monophyletic in the mitochondrial gene genealogies and have unique haplotypes in the nuclear RAG1 gene. We recognize three of these as distinct species and a fourth one as candidate species which requires additional study for final confirmation and description. The three species are (1) *G. decaryi* Angel, 1930, from Midongy and Ranomafana, characterized by relatively long limbs and continuous dorsal folds; (2) *Gephyromantis verrucosus* Angel, 1930 from Vondrozo and Manombo, herein removed from the synonymy of *G. boulengeri*, including the designation of a lectotype, characterized by irregular tubercles on the dorsum, and *G. hintelmannae* **sp. nov.** from Tsitolaka forest near Ambohitsara village and a second nearby site, characterized by a relatively smooth dorsum, short note duration in advertisement calls, and lack of light-dark pattern along the upper lip. A fourth lineage morphologically similar and phylogenetically placed sister to *G. hintelmannae* is characterized by the shortest note duration in calls of the complex but we consider the available data as insufficient to fully assess its status and propose to keep considering this lineage as candidate species *Gephyromantis* sp. 7 until more specimens and data become available.

Key words: Amphibia: Anura: Mantellidae: *Gephyromantis*; *Gephyromantis decaryi*, *Gephyromantis verrucosus*, *Gephyromantis hintelmannae* **sp. nov.**, LBF, little brown frogs, cryptic diversity, Madagascar

Introduction

All birds look like sparrows to me. There are big sparrows, small sparrows and gaily colored sparrows.
—Andy Rooney—(1980)

In the above cited newspaper column, Andy Rooney describes his inability to distinguish things using identification guides, which in his case is not only confined to sparrows, but also ferns, shells and Persian rugs (Rooney 1980). This is a neat example for the subjective nature of the term ‘cryptic diversity’—the expert on the field of sparrow identification might be able to immediately ‘see’ a higher number of species than a layman would, looking at a group of little brown birds (though maybe failing to distinguish a Kaftari from a Moolagian rug, cf. Rooney 1980). Naturally, such little brown birds (abbreviated LBB in bird watcher slang, e.g., Campbell 1991), sometimes also referred to as BBB - boring brown birds (Johann 2000) or BLBB - boring little brown birds (e.g., Smith 1997 citing Rising 1996) gained fewer attention from taxonomists in the past than their colorful or otherwise ornamented relatives. Recent advances in integrative taxonomy (Dayrat 2005; Padial *et al.* 2009) led to a wide array of new species being identified in cryptic lineages (e.g., in Malagasy lemurs, Yoder *et al.* 2000 or birds, Sangster 2009) which in many cases has been criticized as being the outcome of taxonomic inflation (the partitioning of existing species based on shallow divergences in phylogenetic clades) instead of true taxonomic progress (e.g., Isaac *et al.* 2004; Tattersall 2007: “*we live in inflationary times*”). In other groups of organisms (and one might even suspect a