



Osteological characterization of four putative species of the genus *Adenomera* (Anura: Leptodactylidae), with comments on intra- and interspecific variation

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Abstract

Previous osteological characterizations of members of the frog genus *Adenomera* have been based on selected features. The purpose of this study is to establish a detailed osteological description of four putative species of the genus *Adenomera*. There is considerable variation, which we postulate corresponds to both intra- and interspecific variation. Osteology should provide a set of characters appropriate for cladistic analyses to help elucidate relationships within the Subfamily Leptodactylinae. Much of the adult osteological variation has a high probability of having evolved through the process of heterochrony.

Key words: Leptodactylidae, osteology, *Adenomera*, taxonomy

Resumen

Caracterizaciones osteológicas previas de los miembros del género *Adenomera* han sido basadas en algunos caracteres particulares. La propuesta de este estudio es establecer una detallada descripción de cuatro especies putativas del género *Adenomera*. El material estudiado presentó considerable variación, tanto intra como interespecífica. De manera que la osteología aportaría un set de caracteres útiles para un análisis cladístico que contribuya a elucidar las relaciones dentro de la subfamilia Leptodactylinae. Mucha de la variación osteológica tiene una alta probabilidad de haber evolucionado a través de procesos de heterocronía.

Introduction

The genus *Adenomera* currently includes eight recognized species (Heyer, 1975; De la Riva, 1996; Kwet & Angulo, 2002; Frost, 2006) that occur in South America east of the Andes (Heyer, 1973; Frost, 2004). Heyer (1973; 1974; 1977) studied the systematics of the *marmoratus* group of the genus *Leptodactylus* and revalidated the genus *Adenomera*, which exhibits extensive morphological variation within and among populations of species (De la Riva, 1996). Preserved specimens are difficult to diagnose, and the external morphological variation is such that it is difficult to delimit one species from another. Historically, it has been difficult to resolve the taxonomic problems of the genus and it has been suggested that the resolution of the intrageneric relationships may require molecular and advertisement call data (Heyer, 1975; 1984). In fact, advertisement calls have been effectively used to identify species and recently, researchers have identified new species based on such data (Kwet & Angulo, 2002; Angulo *et al.*, 2003; Angulo & Icochea, 2003). Morphological studies