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Osteology of *Atelopus muisca* (Anura, Bufonidae) from Colombia

JULIO MARIO HOYOS^{1,3}, PAOLA MEDINA² & PAULETTE SCHOCH¹

¹Departamento de Biología, Facultad de Ciencias, Unidad de Ecología y Sistemática (UNESIS), Pontificia Universidad Javeriana, Apartado Aéreo 56710, Bogotá, Colombia. E-mail: jmhoyos@javeriana.edu.co; pschoch@javeriana.edu.co

²Carrera 6# 116-55, apt 201, Bogotá, Colombia

³Corresponding author. E-mail: jmhoyos@javeriana.edu.co

Abstract

The first comprehensive description of the skeleton of *Atelopus muisca* Rueda-Almonacid & Hoyos, 1991 (Bufonidae, Anura) from the Chingaza Natural National Park (Colombia) is provided, and comparisons with some characters described for this species by Coloma and related frogs of the group *A. ignescens* are done. The humerus of male presenting more developed crista ventralis and crista lateralis, and the articulation of the frontoparietal bones showed the presence of sexual dimorphism. These are character not described for species of the genus *Atelopus* belonging to the group *A. ignescens*. *A. ignescens*. Among the other osteological characters we did not find unique feature for the species.

Key words: Comparative morphology, Cordillera Oriental, Cranial osteology, Postcranial osteology, Parque Nacional Natural Chingaza

Introduction

The genus *Atelopus* (Dumeril & Bibron, 1841) is one of the most species-rich genera of Bufonidae, and the largest bufonid genus in the Neotropics. This taxon includes 97 species (Frost 2014), and has been defined by external morphology (Lötters 1996). It is distributed in tropical areas from Costa Rica, through Panamá, Colombia, Ecuador and Perú to Bolivia; some species are found in north–northeast Venezuela and a few in French Guiana and northeast of Brazil (McDiarmid 1971).

Atelopus muisca Rueda & Hoyos, 1991 is only known from the Cordillera Oriental of Colombia in the Chingaza Natural National Park, between 2900 and 3500 meters above sea level (Rueda-Almonacid & Hoyos 1991). Because the descriptions of this species and of most species of *Atelopus* do not include characters of the skeleton, the use of external features in the diagnoses of species and genera prevails (Lötters 1996). The aim of this paper is to present a detailed description of the osteology of *A. muisca*, and provide some comparisons.

Some osteological characteristics that define the genus according to McDiarmid (1971) are: the parasphenoid pointed anteriorly, the medially overlapping sphenethmoid complex, ossified sphenethmoid complex, the otic ramus of the squamosal extending over the prootic, seven presacral vertebrae, atlas fused with the first trunk vertebra, sacrococcygeal articulation is bicondylar, sacral diapophyses greatly expanded, firmisternal pectoral girdle, sternum present, phalangeal formula 2-2-3-3 or 1-2-3-3, and middle ear apparatus generally absent.

It is clear that the osteology of anurans in general, and in *Atelopus* in particular, is useful in systematics (e.g., McDiarmid 1971; Lötters 1996; Coloma 1997, 2000, 2002; Ruiz-Carranza y Osorno-Muñoz 1994; Ruiz Carranza *et al.* 1994; Coloma *et al.* 2010), as an element of the diagnosis and for constructing phylogenetic relationships, taking into account that some osteological characteristics are more conservative than others (Trueb 1973). Based on our results, it will be also possible to make comparisons with the only previous description (unpublished so far) done for the osteology of *A. muisca* (Coloma, 1997).

We found two sexually dimorphic characters not described for these species: The humerus of the male presenting more developed crista ventralis and crista lateralis, and the articulation of the frontoparietal bones showed the presence of sexual dimorphism.

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