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Ontogenetic changes in the ventral colouration of post metamorphic *Elachistocleis haroi* Pereyra, Akmentins, Laufer, Vaira, 2013 (Anura: Microhylidae)

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Abstract. Ontogenetic colour change (OCC) is defined as the progressive and non-reversible process of changes in colouration of organisms associated with their development. Among the many vertebrate groups, amphibians are particularly impressive for their strikingly wide variety of colours, colour patterns, and signals, whose evolutionary and ecological significance have been poorly studied. *Elachistocleis* comprises 18 species currently separated into two main groups based on their ventral colour pattern: one immaculate and the other with specks and/or colour patches. *Elachistocleis haroi* is a small-sized species within the immaculate venter group, distributed in the Yungas and Dry Chaco ecoregions from which little information is known. In a comprehensive sampling of post-metamorphic individuals of *E. haroi* at different stages of development we identified a significant variation in ventral colour pattern, which could denote a progressive filling of yellow colour according to an ontogenetic pattern. To test this hypothesis, we analysed 39 post-metamorphic individuals of *E. haroi* at different stages of development with imaging procedures. We found that yellow spots and their intensity are significantly related to snout-vent length, as major expansion of colour on the sides, gular region and male chest, as almost no development on the belly. We briefly discuss our findings in relation to sexual display and predation avoidance. To our knowledge, this is the first analysis of post-metamorphic OCC in ventral colouration in the genus *Elachistocleis*.

Keywords: amphibia, body size, colour pattern, OCC.

Introduction

Ontogenetic colour change (OCC) is the gradual and non-reversible process of changes in colouration associated with development (Booth, 1990). This phenomenon occurs in many invertebrates and vertebrates, but in most cases its drivers are not well understood. Colour in animals has several functions, such as camouflage, signaling for reproductive partners or predators and contribution to metabolism, i.e., protecting them against radiation (Davis and Grayson, 2008; Toledo and Haddad, 2009; Rojas, 2017; Lambert et al., 2017). At the intraspecific level, colour change has been linked to adaptations to physiological, behavioural, and environmental requirements (Grant et al., 2007; Wilson, Heinsohn and Endler, 2007; Cortesi et al., 2016; Bulbert et al., 2018). Amphibians have a wide variety of colour patterns and signals whose evolutionary and ecological significance has been poorly studied (Hoffman and Blouin, 2000; Toledo and Haddad, 2009; Rojas, 2017).

Within Microhylidae, only a few cases of OCC have been reported. One such case is *Oreophryne ezra* Kraus and Allison, 2009, in which juveniles are black with bright yellow spots and adults change into a uniform peach colour (Kraus and Allison, 2009; Bulbert et al., 2018). The hypothesis proposed by Bulbert et al. (2018) suggested that the distinctive colouration between stages corresponds to a difference in defence strategies, in which juveniles'

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