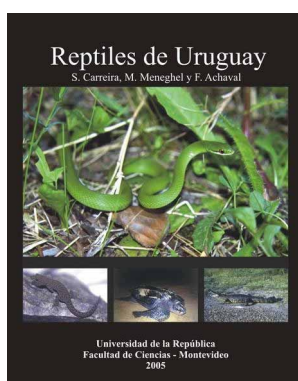


The untold story on the ecological and phylogenetic complexity of the Uruguayan reptile fauna

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Differential regimes of natural selection resulting from environmental complexities are regarded as among the major factors behind processes of evolutionary radiation (Schluter 2000). Therefore, where diverse selective environments converge, diverse organisms in terms of phylogenetic and ecological richness are expected to occur. In some areas of the world, processes of diversification can take the form of geographically widespread evolutionary radiations within the same lineage, as observed for example in the emblematic lizard genus *Anolis* (Losos 2009). In other areas, in contrast, relatively small territories characterized by rich environmental and ecological complexities allow the existence of similarly complex assemblages formed by several different lineages under tight coexistence. A prominent case of this last scenario, although largely hidden until recently, is the reptile fauna of Uruguay. Located at the subtropical Eastern extreme of South America, Uruguay encloses countless natural elements that inspire the development of an exciting story on the wonderful outcomes of ecological interactions, and ultimately, of evolution. Carreira *et al.* (2005) have recently taken the challenge to tell part of this natural story. Focusing on the most fundamental outcome of ecological and evolutionary processes, namely biodiversity at different levels, Carreira *et al.* have come out with the first detailed scientific monograph on the reptiles of Uruguay ever published, and one of the first complete accounts of this ectotherm fauna for the country in almost a century (the only previous complete account is Devincenzi's 1925).

The South American reptile fauna exhibits multiple emblematic elements that have historically resulted of major interest for researchers from several areas of the world, Charles Darwin and Alexander von Humboldt being among the most prominent of these intellectual figures. The naturalist contributions appeared during the last five decades have been complemented by outstanding classical monographs that encompass a broad range of reptile diversity in different areas of this subcontinent (e.g. Medem 1983; Pritchard & Trebbau 1984; Pérez-Santos & Moreno 1988, 1991; Avila-Pires 1995). However, only a few have achieved the exceptional task of covering the entire reptile fauna occurring in a whole country (e.g. Donoso-Barros 1966; Cei 1986, 1993). Remarkably, Carreira *et al.*'s book stands along side these few unique reptile works. Every single species reported to live in Uruguay has been studied, including introduced species such as *Tarentola mauritanica* and the controversial case of *Hemidactylus mabouia*, whose natural establishment in

South America, from Africa, has been the subject of longstanding discussions. Some suggest the species arrived as the result of human intervention, while others argue that it dispersed naturally from one continent to the other (Avila-Pires 1995; Carreira *et al.* 2005). Recent molecular evidence, however, supports the hypothesis of the human-mediated radiation (Carranza & Arnold 2006). The result of Carreira *et al.*'s exhaustive enterprise is a full list of species accompanied by detailed texts on their taxonomic history, morphology, coloration, geographical distribution and ecology. Moreover, a comprehensive species-by-species section of this book is entirely devoted to graphically show detailed maps of distribution and stunning pictures of mostly living specimens and their environments. Carreira *et al.* aim to report, for the small territorial surface of Uruguay, a strikingly rich diversity of major reptile clades, which includes three classes (Crocodylia, Chelonia and Squamata—lizards and snakes), 19 families that might unquestionably rise to over 20 under equally acceptable arguments for lineages such as Liolaemidae and Polychrotidae, often regarded as full families (Frost *et al.* 2001; Pincheira-Donoso *et al.* 2008), and 51 genera. At the lowest phylogenetic scale, a total of 66 species are recognized, which immediately captures the attention to note that such a modest species-richness does not match the extraordinary diversity of higher-level lineages mentioned above. Indeed, as can be seen, the number of species is only slightly higher than the number of genera.

This interesting relative variation of different phylogenetic diversities of the Uruguayan reptile fauna contrasts with those observed in adjacent countries. For example, crocodylians of the genus *Caiman* are more diverse in countries surrounding Uruguay (Medem 1983; Cei 1993), whereas the single *Liolaemus* species found in this country contrasts with the >5 taxa found in the adjacent areas (Pincheira-Donoso *et al.* 2008). As would be expected, this biodiversity scenario is the predictable ecological outcome derived from an environmentally complex geographical area formed by numerous, but small, ecosystems. Indeed, Uruguay can reasonably be considered a country where several of the major ecogeographical systems of eastern South America converge and find an ending. Dunes, forests and grasslands, among others, are common ecological zones found in Uruguay. All tightly enclosed in harmony within a small territory. All contributing a small number of their more intriguing reptile species to transform Uruguay into a remarkable ecological laboratory where competitive interactions, phylogenetic constraints, and evolutionary potential take place to give a unique identity to Carreira *et al.*'s monograph. In addition, the same pattern of diversity is reflected even more in the level of detail presented in Carreira *et al.*'s book, as about 480 pages are dedicated to species-specific accounts. As a whole, this book offers multiple sources of information for making confident field and lab identifications of species and major clades, to inspire questions, and to look for potential answers.

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