

Oral presentation :194

Morphological (osteological) convergence across surface-active and limb-attenuated lizards from three continents: Australia, Asia and Africa

S. D. G. T. M. Silva^{1, 2*}, J. D. Daza¹ and A. M. Bauer³

¹ Department of Biological Sciences, Sam Houston State University, Huntsville, Texas, USA

² Department of Biological Sciences, University of North Texas, Denton, Texas, USA

³ Department of Biology, Villanova University, Villanova, Pennsylvania, USA

*supunidhameera@shsu.edu

Morphological convergence is a classic topic in evolutionary biology. Organisms from different clades that dwell in similar environments often have similar body shapes due to evolutionary convergence. One such morphological convergence cited frequently is the vertebrates having streamlined fusiform bodies (fish like salmon, ichthyosaurs, and dolphins), where their morphology is in response to enhance their locomotion in aquatic environments. However, convergence has been rarely tested at the transcontinental level. Also, not many studies have been done on explaining the evolutionary convergence using skull morphology of squamates; especially in limb-reduced taxa. Here, we report a case of evolutionary convergence of the skull morphology of limb reduced lizards of three continents; Australia, Asia, and Africa. The lizards studied belong to two different clades, gekkotans and skinks. Twenty-seven anatomical landmarks associated with the cranium were placed on high-resolution CT scans of surface active, limb-reduced lizards *Paradelma orientalis* (Pygopodidae) endemic to Australian main land, New Guinea and the neighbouring islands, *Acontias percivali* and *Acontias meleagris* (Scincidae) endemic to Sub Saharan Africa, and *Nessia burtonii* and *Nessia monodactyla* (Scincidae) endemic to Sri Lanka. Additional species of fully limbed geckos and skinks, and two burrowing, limb-reduced species were also included—one dibamid, and one amphisbaenian. The level of similarity of the skulls of lizards was analysed using three-dimensional geometric morphometrics. Results indicated that several lineages of limb-reduced lizards have repeatedly developed similar skull morphology, one time in the Pygopodidae (geckos) and at least 2 times in the Scincidae (*Acontias* and *Nessia*). These groups occupied a similar morphospace, and clustered together with other limbless forms such as dibamids and amphisbaenians in the Principal Component Analysis. This study supports the repeated origin of similar cranial morphology in reptiles that dwell in similar habitats around the world.

Keywords: Convergent evolution, CT scans, geometric morphometrics, pygopods, skinks