



RECOMMENDATION

Inferences on the lifestyle of fossil xenarthrans based on limb long bone inner structure

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Based on reviews by:
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A recommendation of

Amson E and Nyakatura JA. (2018). Palaeobiological inferences based on long bone epiphyseal and diaphyseal structure - the forelimb of xenarthrans (Mammalia). *bioRxiv*, 318121, ver. 5 peer-reviewed and recommended by PCI Paleo. doi: 10.1101/318121

Bone inner structure bears a strong functional signal and can be used in paleontology to make inferences about the ecology of fossil forms. The increasing use of microtomography enables to analyze both cortical and trabecular features in three dimensions, and thus in long bones to investigate the diaphyseal and epiphyseal structures. Moreover, this can now be done through quantitative, and not only qualitative analyses. Studies focusing on the diaphyseal inner structure (cortical bone and sometimes also spongy bone) of long bones are rather numerous, but essentially based on 2D sections. It is only recently that analyses of the whole diaphyseal structure have been investigated. Studies on the trabecular architecture are much rarer.

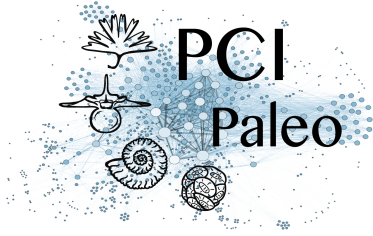
Amson and Nyakatura (2018) propose a comparative quantitative analysis combining parameters of the epiphyseal trabecular architecture and of the diaphyseal structure, using phylogenetically informed discriminant analyses, and with the aim of inferring the lifestyle of extinct taxa. The group of interest is xenarthrans, one of the four major extant clades of placental mammals. Xenarthrans exhibit different lifestyles, from fully terrestrial to arboreal, and show various degrees of fossoriality. The authors analyzed forelimb long bones of some fossil sloths and made comparisons with several species of extant xenarthrans. The aim was notably to discuss the degree of arboreality and fossoriality of these fossil forms.

This study is among the first ones to conjointly analyze both diaphyseal and trabecular parameters to characterize lifestyles, and the first one outside of primates. No fossil form

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could undoubtedly be assigned to one lifestyle exhibited by extant xenarthrans, though some previous ecological hypotheses could be corroborated. This study also raised some technical challenges, linked to the sample and to the parameters studied, and thus constitutes a great step, from which to go further.

References

Amson E and Nyakatura JA. (2018). Palaeobiological inferences based on long bone epiphyseal and diaphyseal structure - the forelimb of xenarthrans (Mammalia). *bioRxiv*, 318121, ver. 5 peer-reviewed and recommended by PCI Paleo. DOI: 10.1101/318121.

Appendix

Reviews by Andrew Pitsillides and an anonymous reviewer, DOI: 10.24072/pci.paleo.100001