Snakes as mediaeval knights in ring armour: Antipredatory strategy in sand boas (Erycidae)

FACULTY OF SCIENCE
Charles University

THIRD FACULTY OF MEDICINE
Charles University

INSTITUTE OF EXPERIMENTAL AND APPLIED PHYSICS CTU IN PRAGUE

Petra Frýdlová (1, 2), Veronika Janovská (1), Jana Mrzílková (2), Jan Dudák (3), Veronika Tymlová (3), Jan Žemlička (3), Petr Zach (2), Daniel Frynta (1)

(1) Department of Zoology, Faculty of Science, Charles University, Prague, Czech Republic
(2) Department of Anatomy, Third Faculty of Medicine, Charles University, Prague, Czech Republic
(3) Institute of Experimental and Applied Physics, Czech Technical University in Prague, Prague, Czech Republic

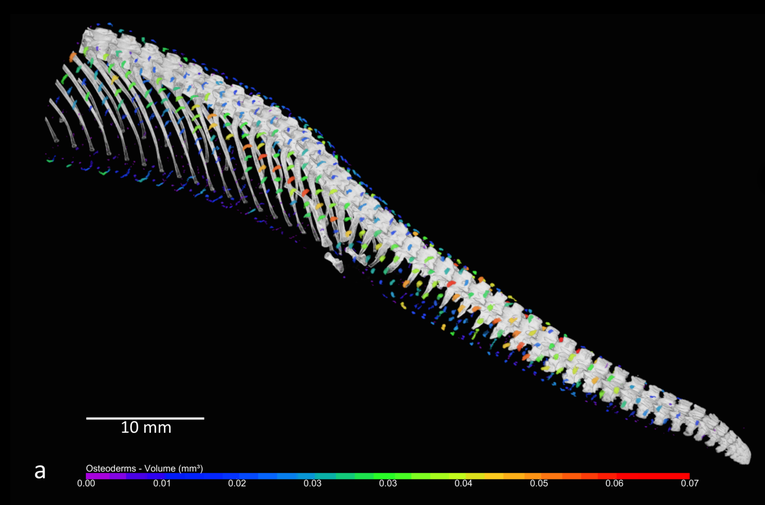
petra.frydlova@natur.cuni.cz

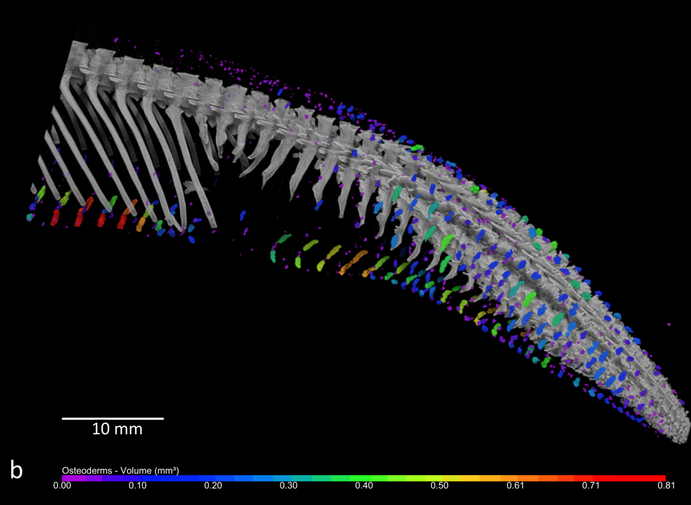
Osteoderms = dermal armour: a structural category of mineralised organs incorporated into the dermis, are present in representatives of the major tetrapod lineages

Q: Snakes really don't have osteoderms?

Material & Methods:
69 specimens, 27 species
µCT and µRTG

Eryx conicus
Scan for video





Eryx colubrinus
Scan for video

Eryx miliaris
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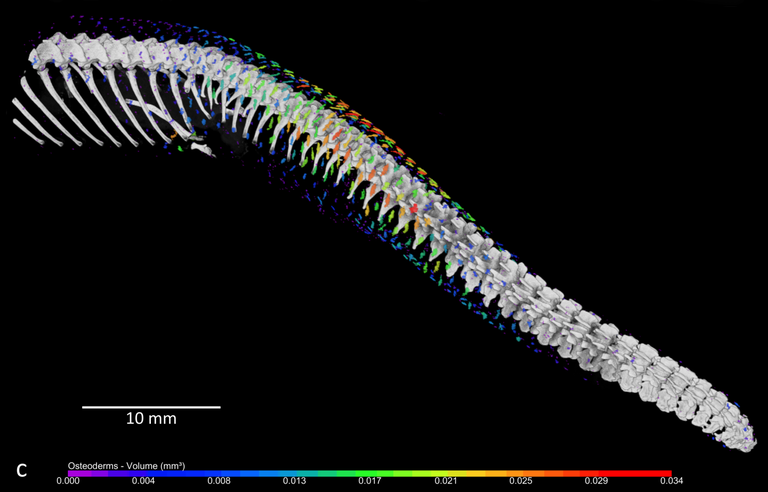
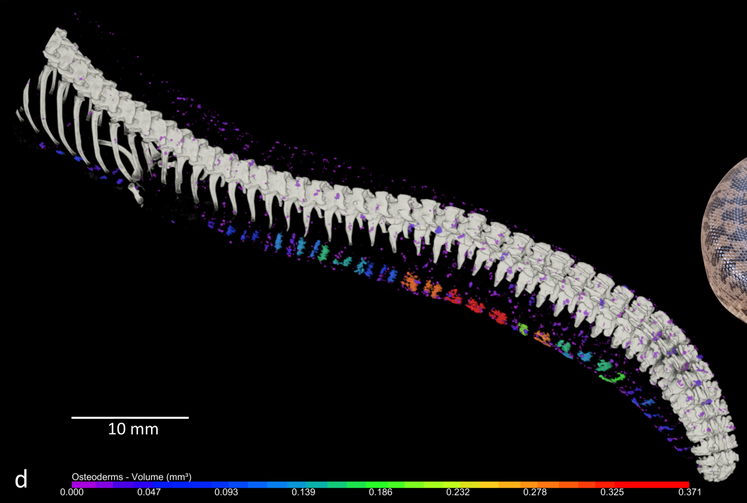


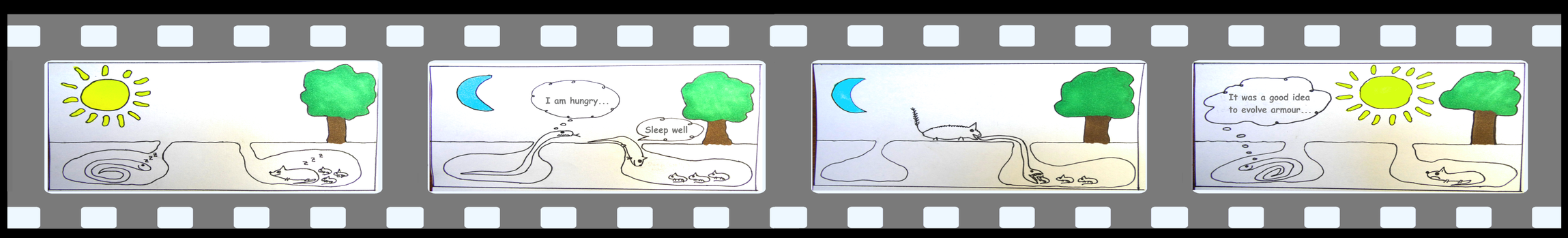


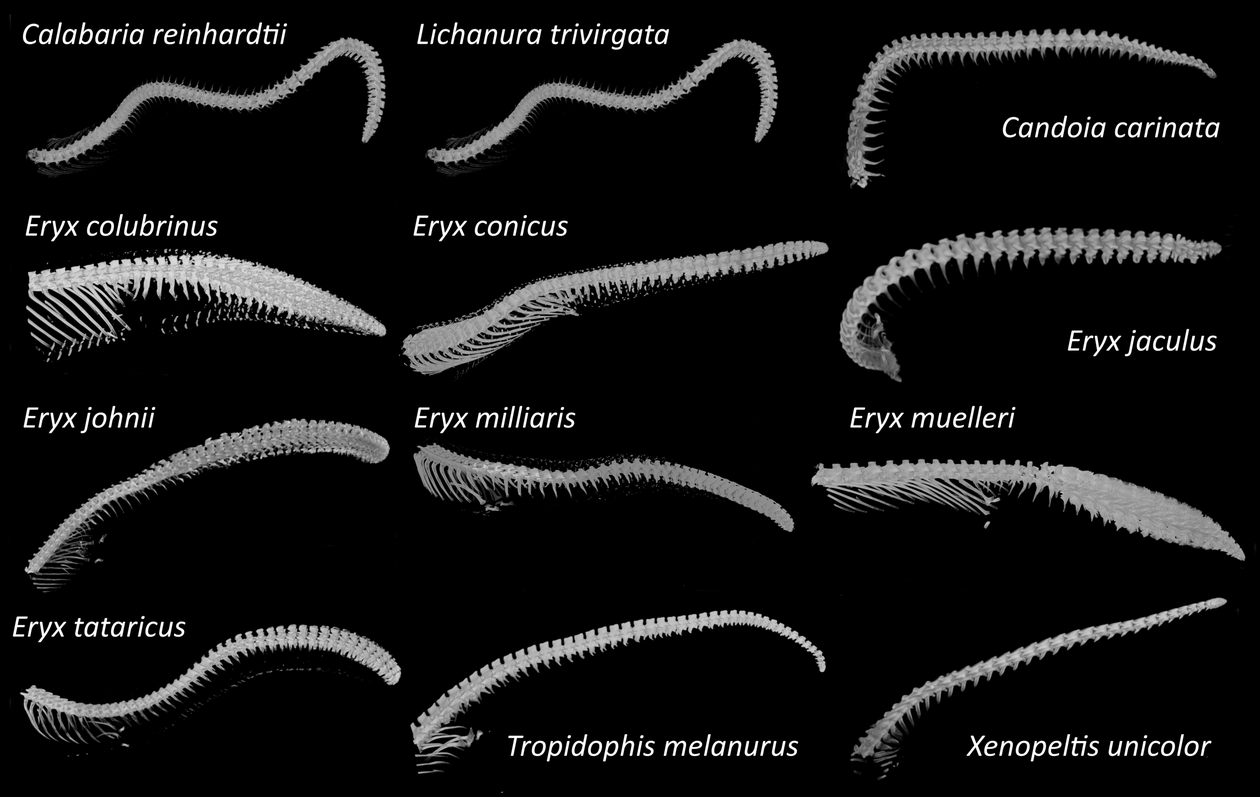
Eryx tataricus
Scan for video

Figure 1. Visualisation of the caudal part of the body and tail of the sand boas by µCT. (a) *Eryx conicus*, (b) *E. colubrinus*, (c) *E. miliaris*, (d) *E. tataricus*. The small, coloured structures are osteoderms, which are present on the tail and the caudal part of the body prior to the cloaca. Colours are according to the volume (in mm^3) of osteoderms. Note the different scales of volume for each species. Osteoderms do not cover the body continuously; rather they are individually distributed across the surface inside the skin. The distribution of osteoderms is regular resembling the distribution of scales. Bar 10 mm.

We discovered dermal armour in four species of sand boas
This is the first description of dermal armour in snakes

We hypothesise that dermal armour is a passive defensive strategy, which is associated with fossoriality and a specialized foraging tactic. This passive defensive strategy is supported by the specialized skeletal morphology of the tail, with highly modified caudal vertebrae nearly filling in the whole volume of the tail.





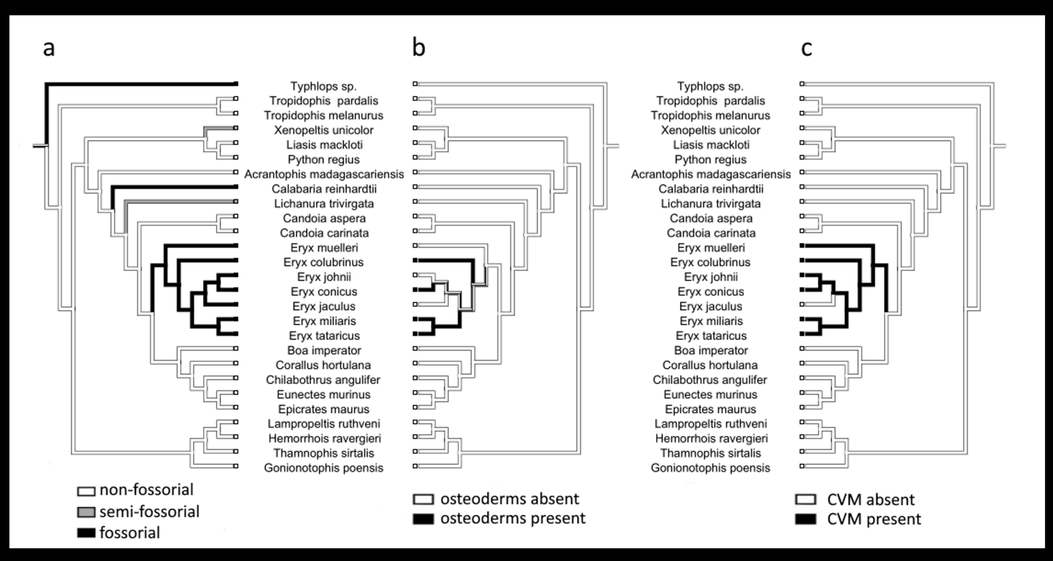


Figure 2. Caudal and tail morphology of studied snakes as revealed by µCT. Note small osteoderms visible in *E. colubrinus*, *E. conicus*, *E. miliaris* and *E. tataricus*. Caudal vertebrae modifications are apparent in all species of *Eryx* except *E. jaculus*.

Figure 3. Visualisation of (a) ecology, (b) presence of osteoderms, and (c) presence of caudal vertebrae modifications (CVM) in snakes. Ancestral state reconstruction using maximum parsimony following the topology of Reynolds et al. 2014 was employed in Mesquite.

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