Two Million Years of Grass Eating: Decoupling of Diet and Morphology in Elephas recki From the Shungura Formation, Lower Omo Valley, Ethiopia

Tomas Getachew Bedane*[1], Mackaye Taïsso Hassane[2], Blade Engda Redae , and Jean-Renaud Biosserie

[1]Researcher – Éthiopie
[2]President – Tchad

Résumé

Proboscideans are key components of African terrestrial ecosystems and serve as important indicators for studying morphological evolution and paleoenvironmental change. Among them, the extinct species *Elephas recki* stands out for its extensive geographic range and excellent fossil record which makes it suitable for exploring evolutionary dynamics in megaherbivores. This study focuses on *E. recki* specimens from the Plio-Pleistocene Shungura Formation in the Lower Omo Valley, Ethiopia, a site renowned for its nearly continuous stratigraphic sequence and rich vertebrate assemblages. We analyzed well-preserved third molars to track morphological changes across the Shungura stratigraphic sequence (i.e., members B to L) and performed mesowear angle analysis of all identifiable cheek teeth to reconstruct dietary behavior. The results reveal that morphological evolution in *E. recki* within the Shungura Formation did not follow a simple, gradual trajectory. Instead, we observed a pattern marked by sudden changes, suggesting episodic evolutionary shifts rather than steady directional trends. The mesowear analysis indicates that *E. recki* maintained a predominantly grazing diet throughout the sequence, with only minor shift toward mixed feeding during certain time intervals. As such, we found no clear correlation between morphological evolution and dietary preferences over the two-million-year span. This decoupling of morphology and function suggests a delayed morphological response or more complex relationship with environmental pressures than previously assumed. Our findings highlight the importance of integrating behavioral, ecological, and stratigraphic data to better understand evolutionary processes in megaherbivores. The case of *E. recki* underscores the need to reconsider how adaptive traits evolve in response to environmental change over large timescales.

Mots-Clés: Elephas recki, Megaherbivores, Mesowear, Shungura Formation

*Intervenant