

GEOMETRIC MORPHOMETRICS – A NEW TOOL TO CLASSIFY SOUTH AMERICAN QUATERNARY GOMPHOTHERE (PROBOSCIDEA: MAMMALIA) MOLAR REMAINS?

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Fossil proboscideans are amongst the most abundant fossil megafauna in the Quaternary of South America. Problematically, this group has few diagnostic characteristics to taxonomically determine fossils, as only skulls and tusks can currently be used to differentiate between species. Such remains are found only scarcely, while most fossil material consists of molars, which were so far not usable for species determination. As a result, the majority of South American proboscidean remains cannot be determined on the species level, complicating species-niche discrimination and hampering palaeoecological analyses. Here, we try to compensate for this shortcoming by employing geometric morphometric analyses to differentiate between two monospecific genera of South American Quaternary gomphotheres (i.e. *Notiomastodon* and *Cuvieronius*) using left and right third lower molars (IM₃, rM₃). We chose 29 third lower molars (M₃) belonging to *Cuvieronius hyodon* and *Notiomastodon platensis* specimens from North, Central, and South America. Occlusal pictures were obtained both from published papers and museum collection material. Only M₃ associated with diagnostic remains (i.e. skulls or tusks) were used, so that the degree of correct classification using only molars could be assessed independently. Landmarks and semi-landmarks were extracted using ImageJ v. 1.8.0_172, generating a total of 1740 landmark coordinates. Data were analysed with MorphoJ v. 1.07a, using canonical variates analysis with 1000 permutations to differentiate between species. Based on the rM₃ data, *C. hyodon* and *N. platensis* differ significantly in tooth morphology at $p = 0.038$. These results look promising and may allow to differentiate between *C. hyodon* and *N. platensis* (and potentially other fossil proboscidean species and genera) based on molar morphology, using well calibrated databases. If successful, this will allow more complete studies of American Quaternary Gomphothere palaeobiology, as it would allow to use fossil material that has been unusable so far for lack of known species attribution.