EXAMINING ECOMORPHOLOGY USING 3D GEOMETRIC MORPHOMETRIC ANALYSIS ON THE POSTCRANIA OF THE MESOZOIC MAMMALIAFORM *BOREALESTES*

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Early mammal groups underwent diversification in the Middle Jurassic, including the stem-mammalian clade, Docodonta. Recent discoveries in China indicate docodontans exhibited ecomorphological diversity similar to extant small-bodied mammals, but our understanding of the emergence of this ecological diversity is hindered by: 1) a lack of Middle Jurassic fossils from other parts of the world; 2) the difficulties in detecting ecomorphological signals in small-bodied animals; 3) limitations in quantitative comparison between early-diverging, extinct Mesozoic taxa, with that of highly derived extant mammals. In this study, we examined two extremely rare partial postcranial skeletons of *Borealestes serendipitus* and *Borealestes cuillinensis*. These docodontan mammaliaform specimens come from the Kilmaluag Formation, Scotland, and are currently the most complete Mesozoic mammaliaform skeletons described from the UK, and among the best preserved in Europe. *Borealestes* is considered an early diverging member of Docodonta, and so provides key information for understanding the clade's anatomical evolution, and the emergence of ecomorphological diversity in mammaliaforms as a whole. Using digital reconstructions of the skeletal elements (from micro-CT and synchrotron scan data), we carry out principal components analyses using 3D landmarks on these fossils and a comparative dataset of 42 extant mammal taxa. *Borealestes* is morphologically intermediate between the robust morphology of fossorial and semi-fossorial/semi-aquatic *Haldanodon* and *Docofossor*, and the gracile morphology for scansorial *Agilodocodon* and *Microdocodon*. Our results indicate *Borealestes* lacked specialisations for derived locomotor behavior, although we detect some similarity in the humerus between *Borealestes* and *Ornithorhynchus*. We suggest ecological diversity in Docodonta may arise from an unspecialised basal bauplan, of which *Borealestes* may be representative.