Table S3. The *p*-values generated by the phylogenetic ANCOVA comparing the intercept of each extinct member of the sample to the intercept of the rest of the sample, given a common slope, for different subsamples of taxa. These values have not been adjusted with the Benjamini & Hochberg procedure. Significant differences are highlighted in aqua. Abbreviations: BR, brain-remainder volume (brain volume minus optic-tectum volume); ER, endocast-remainder surface area (endocast surface area minus optic-lobe surface area); FMa, foramen-magnum area; FMw, foramen-magnum width; OL, optic-lobe surface area; OT, optic-tectum volume.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **complete sample of extant and extinct taxa – Wulst and hyperpallium** | | | | | | |
| **Specimen** | **H v. BR** | **W v. ER** | **W v. FMa** | **W v. FMw** | **H v. FMa** | **H v. FMw** |
| *Dinornis* | 0.65 | 0.15 | 0.92 | 0.55 | 0.95 | 0.73 |
| Miocene galliform | 0.89 | 0.40 | 0.64 | 0.10 | 0.62 | 0.16 |
| *Paraptenodytes* | 0.69 | 0.92 | 0.98 | 0.74 | 0.72 | 1.0 |
| *Psilopterus* | 0.90 | 0.91 | 0.98 | 0.32 | 0.86 | 0.36 |
| *Llallawavis* | 0.75 | 0.78 | 0.98 | 0.48 | 0.93 | 0.48 |
| **complete sample of extant and extinct taxa – optic lobe and optic tectum** | | | | | | |
| **Specimen** | **OT v. BR** | **OL v. ER** | **OL v. FMa** | **OL v. FMw** | **OT v. FMa** | **OT v. FMw** |
| *Archaeopteryx* | 0.61 | 0.38 | 0.78 | 0.22 | 0.98 | 0.25 |
| *Lithornis* | 0.086 | 0.36 | 0.99 | 0.69 | 0.97 | 0.70 |
| *Dinornis* | 5.0e-4 | 0.016 | 0.012 | 0.022 | 0.010 | 0.027 |
| Miocene galliform | 0.16 | 0.90 | 0.83 | 0.73 | 0.79 | 0.71 |
| *Paraptenodytes* | 0.95 | 0.57 | 0.63 | 0.60 | 0.59 | 0.55 |
| *Psilopterus* | 0.79 | 0.46 | 0.43 | 0.22 | 0.59 | 0.33 |
| *Llallawavis* | 0.82 | 0.37 | 0.39 | 0.42 | 0.58 | 0.59 |
| **extant and extinct taxa minus *Apteryx*** | | | | | | |
| **Specimen** | **OT v. BR** | **OL v. ER** | **OL v. FMa** | **OL v. FMw** | **OT v. FMa** | **OT v. FMw** |
| *Archaeopteryx* | 0.60 | 0.77 | 0.52 | 0.24 | 0.75 | 0.28 |
| *Lithornis* | 0.24 | 0.24 | 0.92 | 0.71 | 0.90 | 0.73 |
| *Dinornis* | <4.9e-5 | <4.9e-5 | 1.3e-3 | 7.0e-4 | 7.0e-4 | 1.2e-3 |
| Miocene galliform | 0.19 | 0.21 | 0.84 | 0.73 | 0.80 | 0.71 |
| *Paraptenodytes* | 0.94 | 0.48 | 0.71 | 0.69 | 0.67 | 0.62 |
| *Psilopterus* | 0.77 | 0.67 | 0.45 | 0.19 | 0.65 | 0.31 |
| *Llallawavis* | 0.79 | 0.59 | 0.44 | 0.50 | 0.68 | 0.70 |
| **extant and extinct taxa minus *Apteryx* and *Dinornis*** | | | | | | |
| **Specimen** | **OT v. BR** | **OL v. ER** | **OL v. FMa** | **OL v. FMw** | **OT v. FMa** | **OT v. FMw** |
| *Archaeopteryx* | 0.58 | 0.65 | 1.0 | 0.59 | 1.0 | 0.57 |
| *Lithornis* | 0.45 | 0.36 | 0.34 | 0.91 | 0.34 | 0.94 |
| Miocene galliform | 0.21 | 0.13 | 0.42 | 0.84 | 0.52 | 0.93 |
| *Paraptenodytes* | 0.97 | 0.60 | 0.72 | 0.45 | 0.90 | 0.71 |
| *Psilopterus* | 0.77 | 0.68 | 0.73 | 0.16 | 0.79 | 0.27 |
| *Llallawavis* | 0.83 | 0.71 | 0.87 | 0.57 | 0.97 | 0.82 |