

SUPPLEMENTAL INFORMATION

To place the new specimen in some level of context, the specimen was placed into a Caenagnathid phylogeny using the data matrix constructed by Funston et al. 2020. The analysis was run in TNT using 10,000 replications and a subsequent round of Tree Bisection Reconnection to find the shortest trees. This returned one most parsimonious tree of length 644 steps. Bremer support for the major nodes in Oviraptorosauria is strong, but internal support is weaker as expected. Dr. Funston ran the analysis in TNT, using 10,000 replications and a subsequent round of TBR to find the shortest trees. This worked quite well and popped out one most parsimonious tree of length 644 steps. Bremer support for the major nodes in Oviraptorosauria is quite strong, but internal support is weaker, as expected. CM 96523 comes out closer to *Elmisaurus* and *Citipes*, which makes sense because of the interpretation of the fusion of distal tarsal IV to metatarsal IV. This would place CM 96523 in the subfamily Elmisaurinae, defined prior as all Caenagnathids more closely related to *Elmisaurus rarus* than to *Caenagnathus collinsi* [51,62]. Time calibration of the phylogeny was done using the *strap* package in R and the age of the Hell Creek Formation for CM 96523.

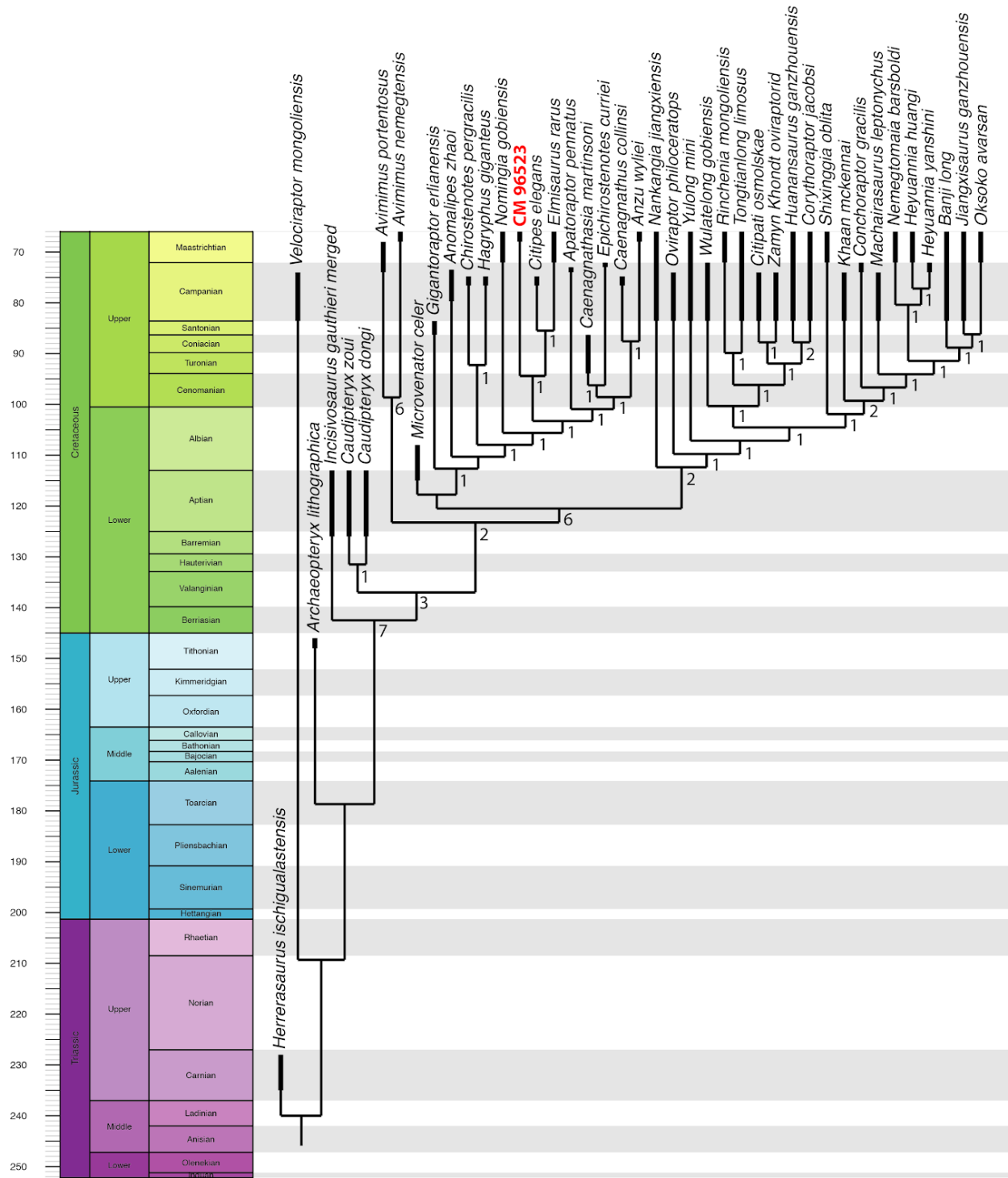


Fig S1. Time-Calibrated Phylogeny showing the position of specimen CM 96523. Bremer support values indicated below the nodes of ingroup taxa.

Table S1. Volumes of the convex hulls used to generate a minimum convex hull estimate of body mass for *Anzu wyliei*.

Body segment	Volume (cm³)	Volume (m³)	Mass (800kg/m³)	Mass (1000kg/m³)
Torso	125274.625	0.125274625	100.2197kg	125.274625kg
Tail	12802.94043	0.01280294	10.24235234kg	12.80294043kg
Skull	10121.46387	0.010121464	8.097171094kg	10.12146387kg
Neck	12408.58691	0.012408587	9.926869531kg	12.40858691kg
L humerus	797.968811	0.000797969	0.638375049kg	0.797968811kg
L forearm	464.968689	0.000464969	0.371974951kg	0.464968689kg
L fingers	1855.232666	0.001855233	1.484186133kg	1.855232666kg
R humerus	744.117065	0.000744117	0.595293652kg	0.744117065kg
R forearm	466.130646	0.000466131	0.372904517kg	0.466130646kg
R fingers	4343.450684	0.004343451	3.474760547kg	4.343450684kg
L stylopod	4343.450684	0.004343451	3.474760547kg	4.343450684kg
L zeugopod	2814.483398	0.002814483	2.251586718kg	2.814483398kg
L autopod	7956.745605	0.007956746	6.365396484kg	7.956745605kg
R stylopod	4343.51416	0.004343514	3.474811328kg	4.34351416kg
R zeugopod	2792.091309	0.002792091	2.233673047kg	2.792091309kg
R autopod	7956.643555	0.007956644	6.365314844kg	7.956643555kg

Total	199486.4135cm ³	0.199486413m ³	159.5891308kg	199.4864135kg
--------------	----------------------------	---------------------------	---------------	---------------