Additional File 1: Supplemental material for:

# Functional ecological convergence between the thylacine and small prey-focused canids.

Rovinsky, DS, Evans, AR, Adams JW.


| | | |
|---|---|---|
| **Figure S1:** | **Cranial PCs 1-2 mapped onto phylogeny** | 2 |
| **Figure S2:** | **Cranial PCs 3-4 mapped onto phylogeny** | 3 |
| **Figure S3:** | **Facial PCs 1-2 mapped onto phylogeny** | 4 |
| **Figure S4:** | **Facial PCs 3-4 mapped onto phylogeny** | 5 |
| **Figure S5:** | **Neurocranial PCs 1-2 mapped onto phylogeny** | 6 |
| **Figure S6:** | **Neurocranial PCs 3-4 mapped onto phylogeny** | 7 |
| **Table S1:** | **CVA coefficients and discrimination** | 8 |
| **Table S2:** | **Spearman correlation and Wilcoxon ranked sum test results** | 9 |
| **Table S3:** | **Convergence results - cranial** | 10 |
| **Table S4:** | **Convergence results - facial** | 11 |
| **Table S5:** | **Convergence results - neurocranial** | 12 |
| **Table S6:** | **Specimen list** | 13 |
| **Table S7:** | **Phylogenetic tree references** | 21 |
| **Table S8:** | **Landmark and semilandmark list and protocol** | 22 |
| **Table S9:** | **References for body mass and diet** | 28 |


Additional data (Morphologika files, phylogenetic tree, diet & body mass data, data for replication of analyses) and R code can be found at: Figshare Project 84905

https://figshare.com/projects/Convergence_between_the_thylacine_and_small_prey-focused_canids/84905

Surface meshes can be found at: Morphosource Project P1004.

https://www.morphosource.org/Detail/ProjectDetail/Show/project_id/1004

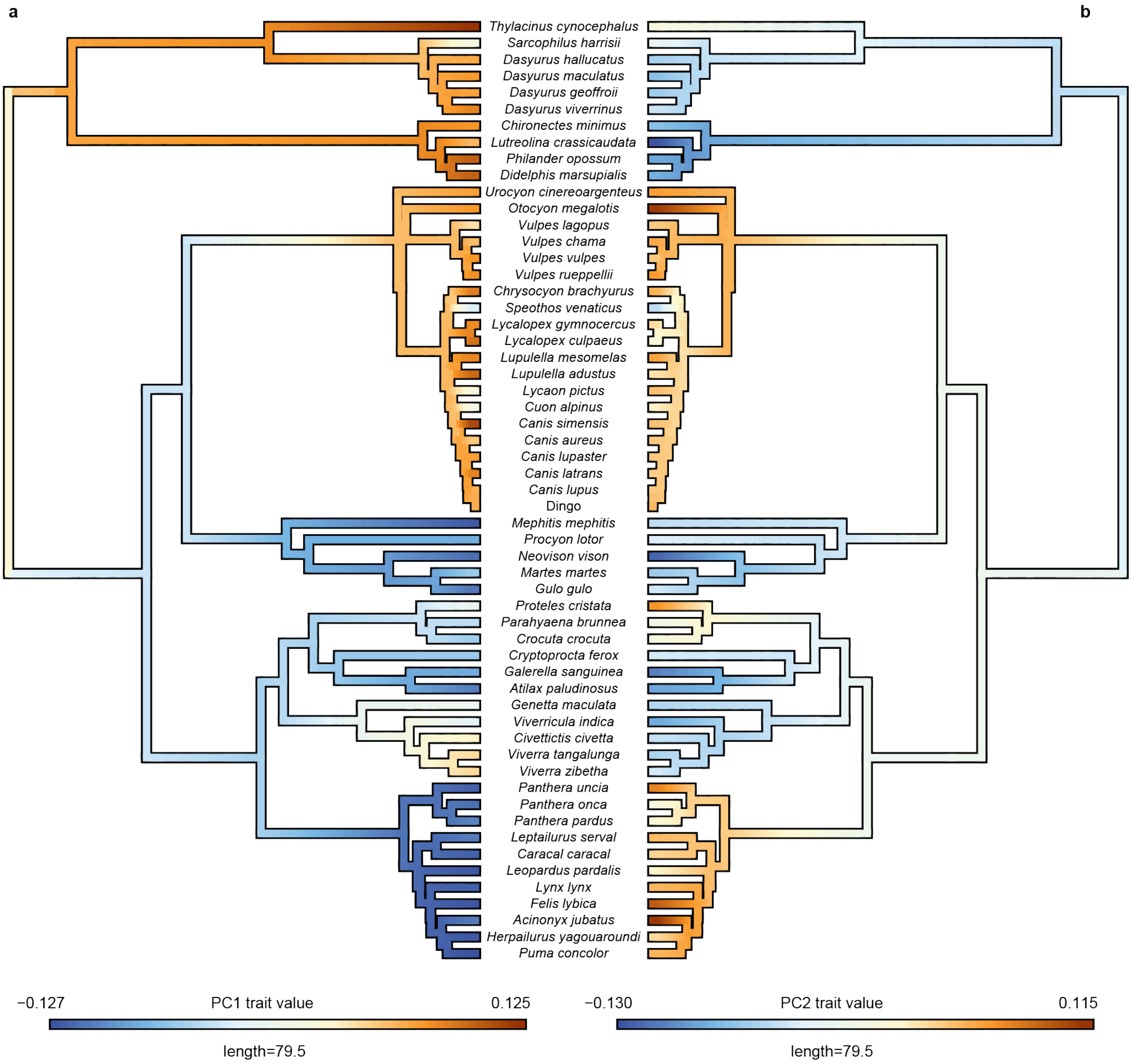


**Figure S1.** Total cranium dataset PC1 (a) and PC2 (b) mapped onto phylogeny.

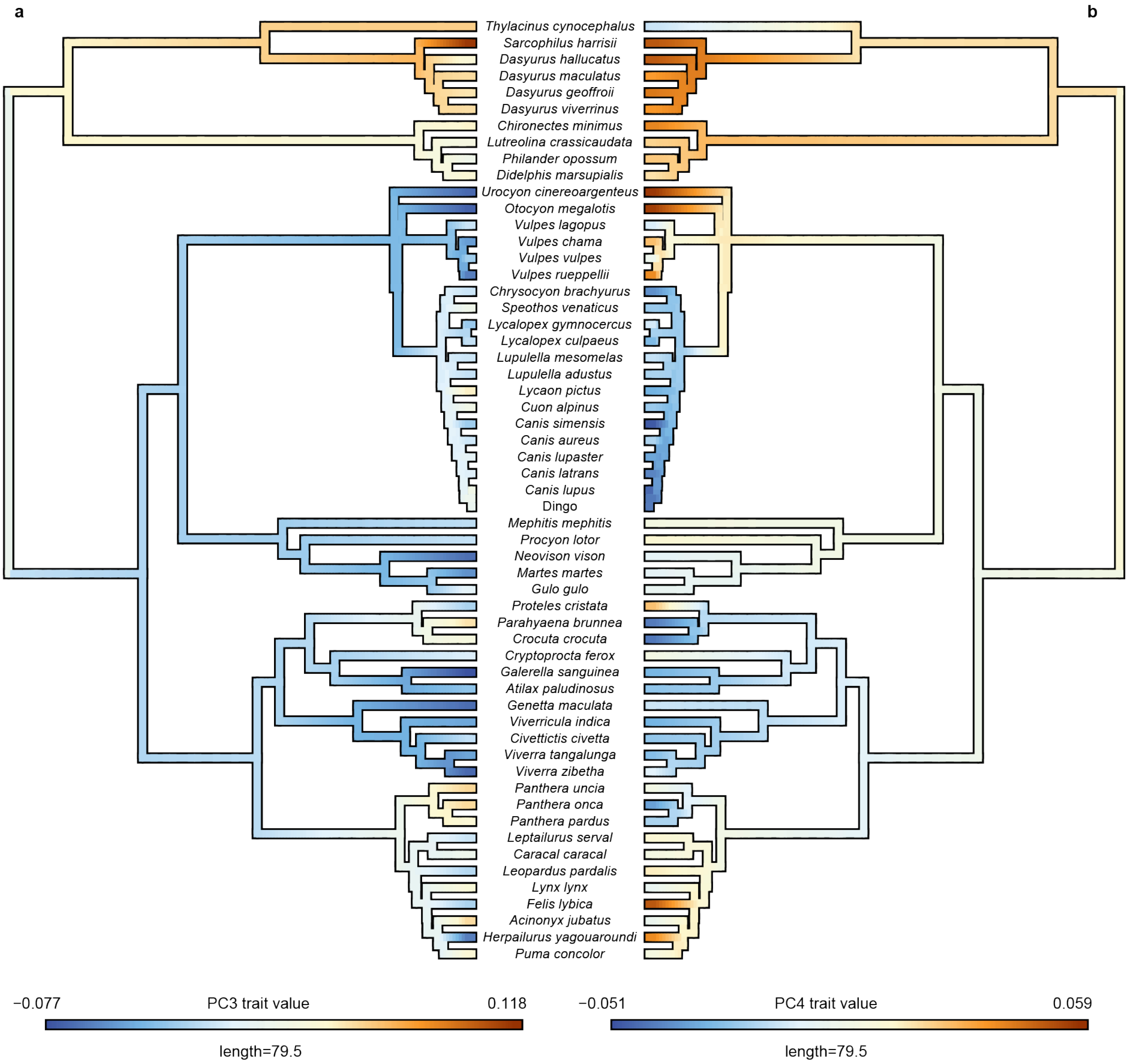


**Figure S2.** Total cranium dataset PC3 (a) and PC4 (b) mapped onto phylogeny.

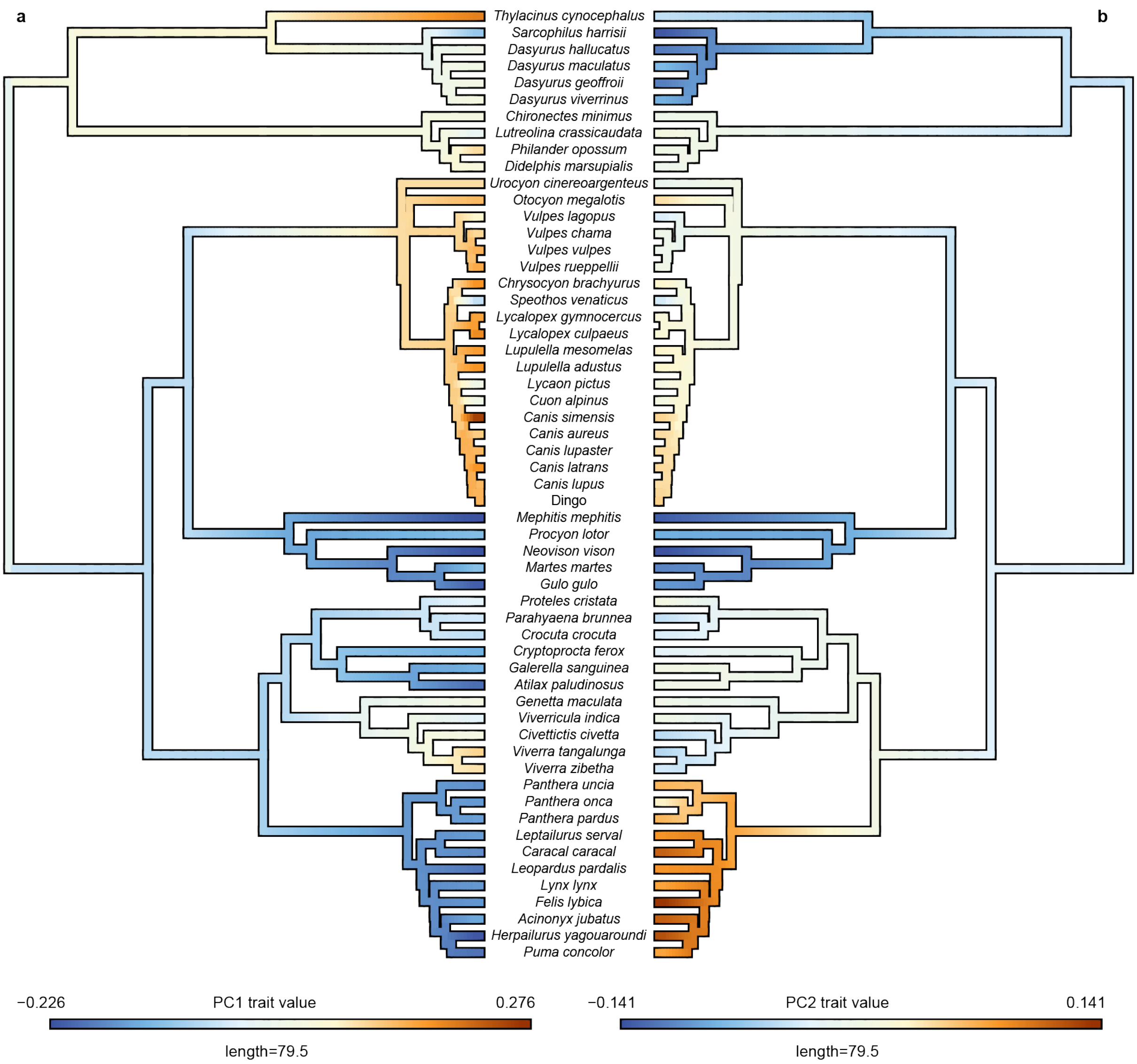


**Figure S3.** Facial patch data subset PC1 (a) and PC2 (b) mapped onto phylogeny.

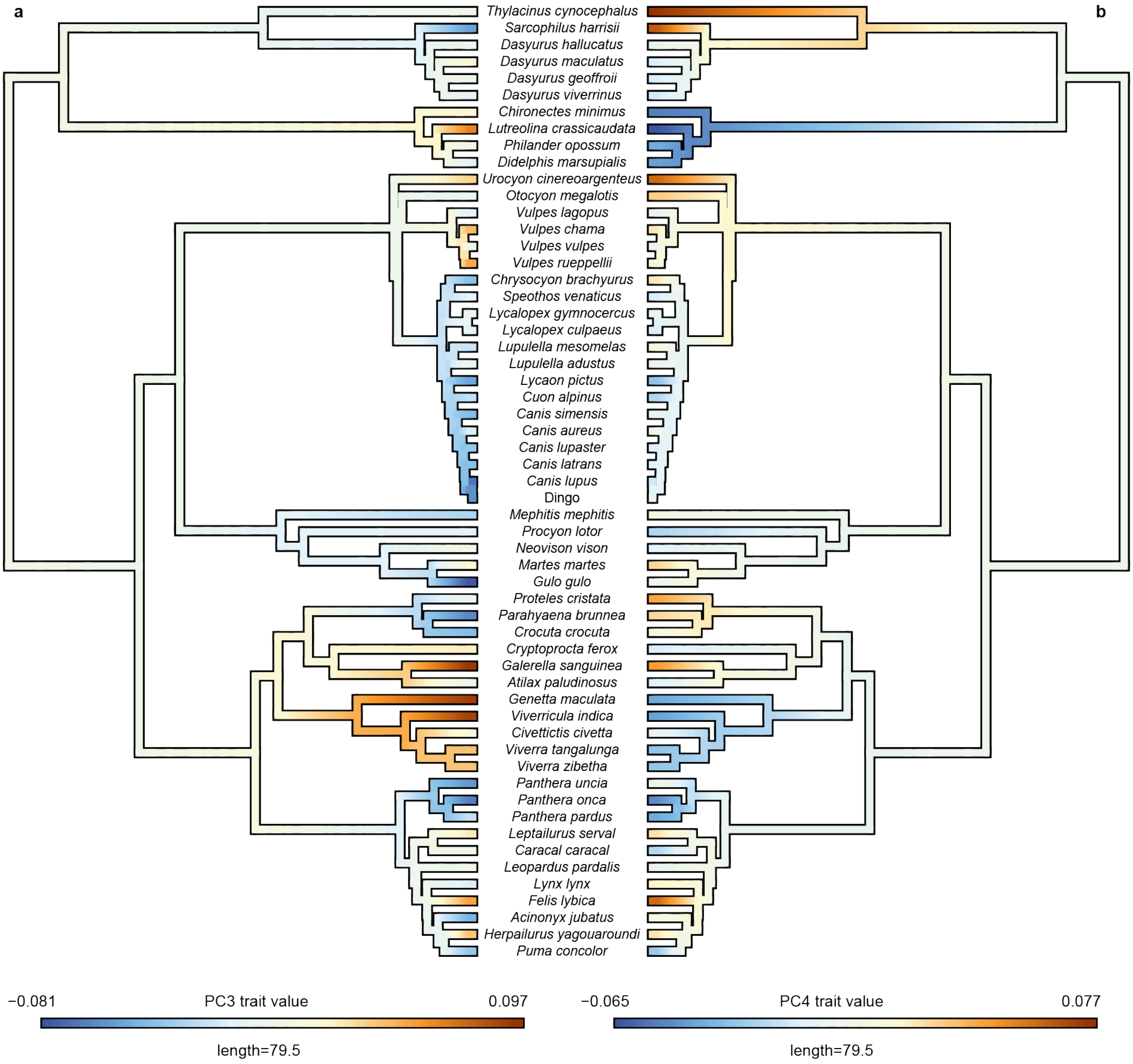


**Figure S4.** Facial patch data subset PC3 (a) and PC4 (b) mapped onto phylogeny.

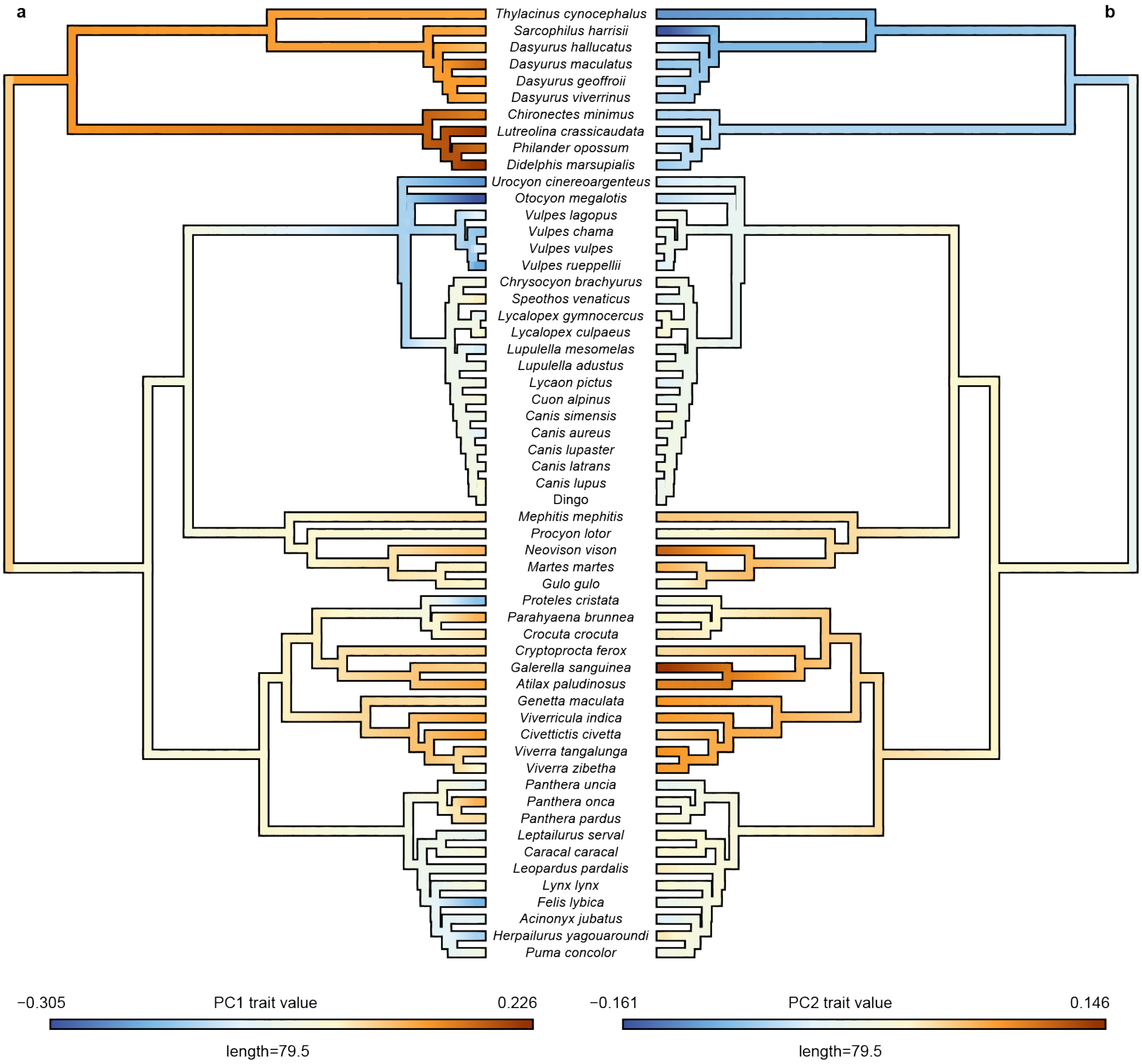


**Figure S5.** Neurocranial patch data subset PC1 (a) and PC2 (b) mapped onto phylogeny.

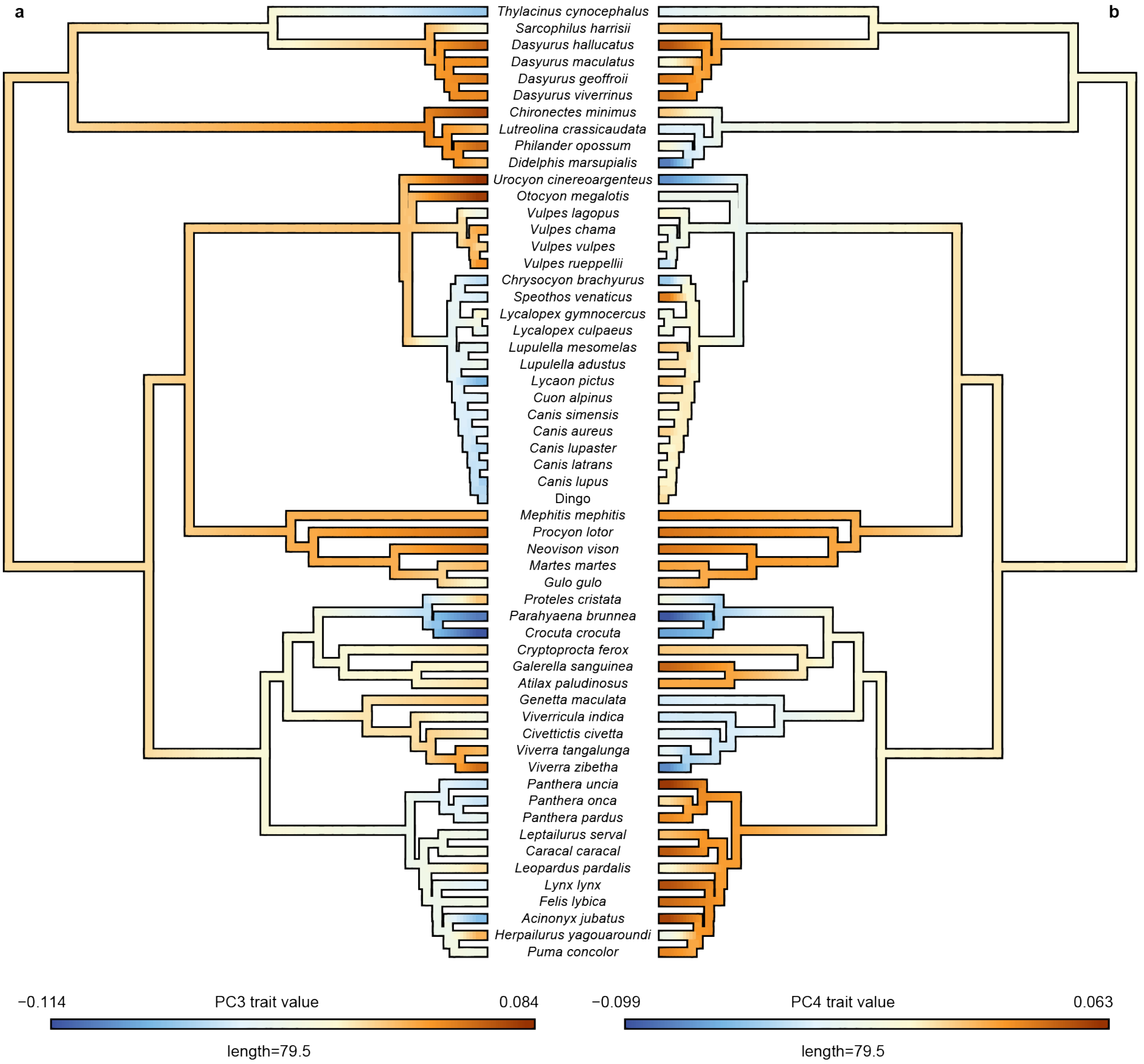


**Figure S6.** Neurocranial patch data subset PC3 (a) and PC4 (b) mapped onto phylogeny.

**Table S1.** Coefficients of linear discriminants.

| PC > 1% var. | Cranial set | Facial set | Neurocranial set |
|---|---|---|---|
| PC1 | 4.7400106 | 3.333185 | -3.055865 |
| PC2 | -3.9941711 | 3.735905 | 8.137784 |
| PC3 | 18.2319980 | 20.247608 | 17.191593 |
| PC4 | 16.3022083 | 7.825238 | -12.262340 |
| PC5 | -0.8015981 | 12.914303 | -3.553954 |
| PC6 | 2.4844696 | -5.584836 | 15.496704 |
| PC7 | 14.7576553 | -13.851487 | 17.271646 |
| PC8 | 23.2724753 | NA | 16.859289 |
| PC9 | -26.2385031 | NA | -14.304833 |
| PC10 | -26.7634082 | NA | NA |

Linear discriminants of all principal components >1% variance. The total cranial set shows 87.4% correct attribution, placing the thylacine into the small prey group (89.4% posterior probability). The facial set shows 80.1% correct attribution, placing the thylacine into the small prey group (95.9% posterior probability). The neurocranial set shows 87.4% correct attribution, placing the thylacine into the large prey group (87.2% posterior probability).

**Table S2.** Spearman's correlation and Wilcoxon rank sum results on PC1—4 of the total cranial dataset.

| | | Spearman's Correlation | | Wilcoxon Rank Sum |
|---|---|---|---|---|
| | Cranium | *P* | rho | *P* |
| PC1 | total | **0.001** | 0.240 | 0.378 |
| | placental | **0.004** | 0.220 | |
| | marsupial | **0.003** | 0.488 | |
| PC2 | total | 0.316 | 0.070 | 0.107 |
| | placental | 0.881 | 0.012 | |
| | marsupial | 0.194 | 0.222 | |
| PC3 | total | **<0.001** | 0.460 | **0.001** |
| | placental | **<0.001** | 0.564 | |
| | marsupial | **0.007** | 0.441 | |
| PC4 | total | **<0.001** | 0.279 | 0.210 |
| | placental | **0.002** | 0.240 | |
| | marsupial | **0.001** | 0.521 | |
| | Face | | | |
| PC1 | total | **0.003** | 0.208 | **<0.001** |
| | placental | **0.015** | 0.187 | |
| | marsupial | **0.023** | 0.377 | |
| PC2 | total | **<0.001** | 0.257 | 0.178 |
| | placental | **<0.001** | 0.282 | |
| | marsupial | **0.001** | 0.545 | |
| PC3 | total | **<0.001** | 0.359 | **<0.001** |
| | placental | **<0.001** | 0.438 | |
| | marsupial | 0.068 | 0.308 | |
| PC4 | total | **<0.001** | 0.248 | **<0.001** |
| | placental | **0.022** | 0.176 | |
| | marsupial | **0.001** | 0.524 | |
| | Neurocranium | | | |
| PC1 | total | 0.184 | 0.093 | 0.378 |
| | placental | **0.001** | 0.256 | |
| | marsupial | 0.160 | 0.239 | |
| PC2 | total | 0.573 | 0.040 | 0.107 |
| | placental | 0.175 | 0.105 | |
| | marsupial | 0.448 | 0.130 | |
| PC3 | total | **<0.001** | 0.476 | **0.001** |
| | placental | **<0.001** | 0.500 | |
| | marsupial | 0.683 | 0.070 | |
| PC4 | total | **<0.001** | 0.376 | 0.210 |
| | placental | **<0.001** | 0.454 | |
| | marsupial | 0.253 | 0.196 | |

Wilcoxon test is between prey size category (< 45% predator mass and > 45% predator mass) in total data set (test for PC differences between prey categories). Bolded values are significant after adjustment for multiple comparisons by the Benjamini-Hochberg method, $\alpha = 0.10$.

**Table S3.** Total cranium C1–C4 and θ˚ convergence results.

| | C1—4 | | | | | | | | θ˚ | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **C1** | ***P*** | **C2** | ***P*** | **C3** | ***P*** | **C4** | ***P*** | **θ** | ***P*** |
| *Canis aureus* | 0.058 | 0.471 | 0.008 | 0.520 | 0.016 | 0.634 | 0.002 | 0.653 | 57.4˚ | **0.008** |
| *Canis latrans* | 0.452 | **0.003** | 0.093 | **<0.001** | 0.133 | 0.066 | 0.024 | 0.045 | 41.4˚ | **0.001** |
| *Canis lupaster* | 0.206 | 0.112 | 0.030 | 0.138 | 0.054 | 0.324 | 0.008 | 0.365 | 41.9˚ | **0.003** |
| *Canis lupus* | 0.201 | 0.139 | 0.030 | 0.159 | 0.051 | 0.368 | 0.008 | 0.392 | 43.7˚ | **0.004** |
| *Canis simensis* | 0.135 | 0.213 | 0.019 | 0.235 | 0.034 | 0.458 | 0.005 | 0.472 | 45.8˚ | **0.009** |
| *Chrysocyon brachyurus* | 0.507 | **0.001** | 0.116 | **<0.001** | 0.175 | 0.017 | 0.030 | 0.013 | 44.4˚ | **0.006** |
| *Cuon alpinus* | 0.327 | **0.025** | 0.072 | **0.002** | 0.110 | 0.107 | 0.019 | 0.093 | 76.1˚ | **0.049** |
| Dingo | 0.182 | 0.144 | 0.027 | 0.160 | 0.047 | 0.384 | 0.007 | 0.397 | 50.0˚ | **0.009** |
| *Lupulella adustus* | 0.537 | **0.001** | 0.122 | **<0.001** | 0.172 | 0.023 | 0.031 | 0.016 | 35.4˚ | **0.001** |
| *Lupulella mesomelas* | 0.524 | **0.001** | 0.134 | **<0.001** | 0.182 | 0.011 | 0.035 | 0.007 | 46.0˚ | **0.006** |
| *Lycalopex culpaeus* | 0.489 | **0.003** | 0.101 | **0.001** | 0.159 | 0.027 | 0.026 | 0.034 | 38.1˚ | **0.003** |
| *Lycalopex gymnocercus* | 0.417 | **0.005** | 0.089 | **0.003** | 0.126 | 0.068 | 0.023 | 0.046 | 51.7˚ | **0.005** |
| *Lycaon pictus* | 0.194 | 0.104 | 0.036 | 0.080 | 0.057 | 0.298 | 0.009 | 0.282 | 71.3˚ | **0.027** |
| *Otocyon megalotis* | 0.078 | 0.394 | 0.018 | 0.309 | 0.029 | 0.496 | 0.005 | 0.486 | 81.1˚ | **0.053** |
| *Proteles cristata* | 0.195 | 0.121 | 0.046 | 0.050 | 0.081 | 0.202 | 0.012 | 0.221 | 96.1˚ | 0.150 |
| *Urocyon cinereoargenteus* | 0.046 | 0.439 | 0.009 | 0.430 | 0.015 | 0.547 | 0.002 | 0.538 | 76.5˚ | **0.045** |
| *Vulpes chama* | 0.159 | 0.181 | 0.030 | 0.131 | 0.048 | 0.379 | 0.008 | 0.362 | 74.5˚ | **0.043** |
| *Vulpes lagopus* | 0.169 | 0.149 | 0.028 | 0.133 | 0.052 | 0.317 | 0.007 | 0.356 | 63.6˚ | **0.022** |
| *Vulpes rueppellii* | 0.090 | 0.350 | 0.017 | 0.293 | 0.026 | 0.514 | 0.004 | 0.500 | 72.3˚ | **0.036** |
| *Vulpes vulpes* | 0.333 | **0.023** | 0.059 | **0.012** | 0.094 | 0.140 | 0.015 | 0.135 | 49.3˚ | **0.006** |

C1 values are the scaled phenotypic distances closed between the species and the thylacine, θ are the search.conv angles between the multivariate phenotypic vectors of the same. Significant *P*-values in bold; significance adjusted for multiple comparisons by the Benjamini-Hochberg method, α = 0.10.

**Table S4.** Facial patch subset C1–C4 and θ° convergence results.

| | C1—4 | | | | | | | | θ° | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **C1** | ***P*** | **C2** | ***P*** | **C3** | ***P*** | **C4** | ***P*** | **θ** | ***P*** |
| *Canis aureus* | 0.194 | 0.251 | 0.044 | 0.230 | 0.073 | 0.413 | 0.009 | 0.478 | 49.6° | **0.026** |
| *Canis latrans* | 0.305 | 0.127 | 0.071 | 0.090 | 0.092 | 0.318 | 0.015 | 0.319 | 42.6° | **0.020** |
| *Canis lupaster* | 0.315 | 0.133 | 0.083 | 0.072 | 0.132 | 0.202 | 0.017 | 0.273 | 49.3° | **0.022** |
| *Canis lupus* | 0.236 | 0.220 | 0.058 | 0.162 | 0.088 | 0.344 | 0.012 | 0.399 | 51.3° | **0.032** |
| *Canis simensis* | 0.237 | 0.200 | 0.054 | 0.164 | 0.078 | 0.377 | 0.011 | 0.406 | 37.7° | **0.007** |
| *Chrysocyon brachyurus* | 0.566 | **0.013** | 0.185 | **0.001** | 0.235 | 0.031 | 0.038 | 0.043 | 36.2° | **0.004** |
| *Cuon alpinus* | 0.176 | 0.212 | 0.060 | 0.045 | 0.102 | 0.206 | 0.011 | 0.317 | 76.6° | 0.104 |
| Dingo | 0.305 | 0.114 | 0.077 | 0.070 | 0.114 | 0.230 | 0.016 | 0.279 | 47.2° | **0.020** |
| *Lupulella adustus* | 0.642 | **0.007** | 0.260 | **<0.001** | 0.279 | 0.016 | 0.054 | **0.010** | 37.6° | **0.009** |
| *Lupulella mesomelas* | 0.627 | **0.005** | 0.256 | **<0.001** | 0.273 | 0.013 | 0.053 | **0.007** | 39.6° | **0.015** |
| *Lycalopex culpaeus* | 0.378 | 0.076 | 0.090 | 0.050 | 0.144 | 0.168 | 0.019 | 0.241 | 38.4° | **0.008** |
| *Lycalopex gymnocercus* | 0.565 | **0.007** | 0.190 | **0.001** | 0.212 | 0.050 | 0.039 | 0.029 | 37.1° | **0.012** |
| *Lycaon pictus* | 0.100 | 0.446 | 0.028 | 0.372 | 0.035 | 0.574 | 0.006 | 0.563 | 90.1° | 0.155 |
| *Otocyon megalotis* | 0.506 | 0.013 | 0.180 | **<0.001** | 0.232 | 0.028 | 0.037 | 0.025 | 48.9° | **0.022** |
| *Proteles cristata* | 0.189 | 0.226 | 0.057 | 0.120 | 0.097 | 0.278 | 0.011 | 0.363 | 81.9° | **0.090** |
| *Urocyon cinereoargenteus* | 0.468 | **0.024** | 0.138 | **0.009** | 0.193 | 0.080 | 0.028 | 0.101 | 38.9° | **0.012** |
| *Vulpes chama* | 0.381 | 0.055 | 0.106 | **0.024** | 0.135 | 0.178 | 0.022 | 0.157 | 46.6° | **0.027** |
| *Vulpes lagopus* | 0.133 | 0.311 | 0.028 | 0.316 | 0.043 | 0.476 | 0.006 | 0.500 | 40.9° | **0.018** |
| *Vulpes rueppellii* | 0.337 | 0.090 | 0.076 | 0.068 | 0.102 | 0.289 | 0.016 | 0.284 | 40.9° | **0.017** |
| *Vulpes vulpes* | 0.356 | 0.076 | 0.076 | 0.070 | 0.127 | 0.213 | 0.016 | 0.304 | 33.5° | **0.004** |

C1 values are the scaled phenotypic distances closed between the species and the thylacine, θ are the search.conv angles between the multivariate phenotypic vectors of the same. Significant *P*-values in bold; significance adjusted for multiple comparisons by the Benjamini-Hochberg method, $\alpha = 0.10$.

**Table S5.** Neurocranium patch subset C1–C4 and θ˚ convergence results.

| | C1—4 | | | | | | | | θ˚ | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Species** | **C1** | ***P*** | **C2** | ***P*** | **C3** | ***P*** | **C4** | ***P*** | **θ** | ***P*** |
| *Canis aureus* | 0.070 | 0.451 | 0.019 | 0.362 | 0.024 | 0.598 | 0.004 | 0.604 | 110.4˚ | 0.179 |
| *Canis latrans* | 0.384 | 0.015 | 0.142 | **<0.001** | 0.137 | 0.087 | 0.027 | 0.052 | 107.8˚ | 0.171 |
| *Canis lupaster* | 0.230 | 0.102 | 0.064 | **0.039** | 0.078 | 0.241 | 0.012 | 0.252 | 94.5˚ | 0.122 |
| *Canis lupus* | 0.318 | 0.043 | 0.088 | **0.012** | 0.097 | 0.182 | 0.017 | 0.164 | 72.1˚ | 0.051 |
| *Canis simensis* | 0.145 | 0.243 | 0.040 | 0.151 | 0.051 | 0.401 | 0.008 | 0.416 | 119.5˚ | 0.201 |
| *Chrysocyon brachyurus* | 0.271 | 0.062 | 0.075 | **0.015** | 0.090 | 0.190 | 0.014 | 0.193 | 80.7˚ | 0.073 |
| *Cuon alpinus* | 0.258 | 0.081 | 0.071 | **0.028** | 0.087 | 0.227 | 0.013 | 0.239 | 87.5˚ | 0.098 |
| Dingo | 0.271 | 0.082 | 0.075 | **0.024** | 0.088 | 0.220 | 0.014 | 0.231 | 84.8˚ | 0.091 |
| *Lupulella adustus* | 0.196 | 0.143 | 0.054 | 0.060 | 0.061 | 0.319 | 0.010 | 0.287 | 116.4˚ | 0.201 |
| *Lupulella mesomelas* | 0.076 | 0.420 | 0.022 | 0.295 | 0.023 | 0.600 | 0.004 | 0.569 | 114.6˚ | 0.192 |
| *Lycalopex culpaeus* | 0.515 | **0.004** | 0.226 | **<0.001** | 0.215 | 0.009 | 0.043 | **0.002** | 96.4˚ | 0.141 |
| *Lycalopex gymnocercus* | 0.014 | 0.694 | 0.004 | 0.660 | 0.004 | 0.737 | 0.001 | 0.723 | 128.1˚ | 0.282 |
| *Lycaon pictus* | 0.243 | 0.091 | 0.067 | **0.029** | 0.079 | 0.226 | 0.013 | 0.213 | 82.7˚ | 0.070 |
| *Otocyon megalotis* | 0.000 | 0.999 | 0.000 | 0.999 | 0.000 | 0.999 | 0.000 | 0.999 | 117.6˚ | 0.199 |
| *Proteles cristata* | 0.000 | 0.999 | 0.000 | 0.999 | 0.000 | 0.999 | 0.000 | 0.999 | 121.2˚ | 0.227 |
| *Urocyon cinereoargenteus* | 0.000 | 0.999 | 0.000 | 0.999 | 0.000 | 0.999 | 0.000 | 0.999 | 114.3˚ | 0.197 |
| *Vulpes chama* | 0.000 | 0.999 | 0.000 | 0.999 | 0.000 | 0.999 | 0.000 | 0.999 | 121.3˚ | 0.223 |
| *Vulpes lagopus* | 0.174 | 0.180 | 0.055 | 0.068 | 0.074 | 0.293 | 0.010 | 0.298 | 117.3˚ | 0.216 |
| *Vulpes rueppellii* | 0.000 | 0.999 | 0.000 | 0.999 | 0.000 | 0.999 | 0.000 | 0.999 | 118.0˚ | 0.215 |
| *Vulpes vulpes* | 0.189 | 0.166 | 0.062 | **0.041** | 0.062 | 0.312 | 0.012 | 0.257 | 125.5˚ | 0.237 |

C1 values are the scaled phenotypic distances closed between the species and the thylacine, θ are the search.conv angles between the multivariate phenotypic vectors of the same. Significant *P*-values in bold; significance adjusted for multiple comparisons by the Benjamini-Hochberg method, $\alpha = 0.10$.

**Table S6.** Specimen list and Morphosource DOIs. Institution abbreviations: AM (Australian Museum, Sydney, Australia), AMNH (American Museum of Natural History, New York, USA), DMNH (Ditsong National Museum of Natural History, Pretoria, South Africa), MSU (Michigan State University, Lansing, USA), NHMUK (Natural History Museum, London, UK), NMV (National Museums Victoria, Melbourne, Australia), SAM (South Australian Museum, Adelaide, Australia), SMNS (State Museum of Natural History, Stuttgart, Germany), TMAG (Tasmanian Museum and Art Gallery, Hobart, Australia), UMZC (University Museum of Zoology, Cambridge, UK), USNM (Smithsonian National Museum of Natural History, Washington, D.C., USA), WAM (Western Australian Museum, Perth, Australia), ZMB (Natural History Museum, Berlin, Germany).

| Specimen | Sex | Species | 3D Mesh Source | DOI |
|---|---|---|---|---|
| DMNH 1217 | F | *Acinonyx jubatus* | CT | https://doi.org/10.17602/M2/M114684 |
| DMNH 1269 | U | *Acinonyx jubatus* | CT | https://doi.org/10.17602/M2/M114685 |
| DMNH 162 | M | *Acinonyx jubatus* | CT | https://doi.org/10.17602/M2/M117243 |
| DMNH 25602 | M | *Acinonyx jubatus* | CT | https://doi.org/10.17602/M2/M114686 |
| DMNH 20426 | M | *Atilax paludinosus* | CT | https://doi.org/10.17602/M2/M114721 |
| DMNH 5330 | M | *Atilax paludinosus* | CT | https://doi.org/10.17602/M2/M114722 |
| DMNH 6191 | F | *Atilax paludinosus* | CT | https://doi.org/10.17602/M2/M114723 |
| DMNH 9019 | F | *Atilax paludinosus* | CT | https://doi.org/10.17602/M2/M114724 |
| AM M 42917 | U | *Canis aureus* | Artec Spider | https://doi.org/10.17602/M2/M114633 |
| NHMUK ZD 1869.8.13.3 | U | *Canis aureus* | Artec Spider | https://doi.org/10.17602/M2/M114671 |
| SMNS Z-MAM 5014 | F | *Canis aureus* | Artec Spider | https://doi.org/10.17602/M2/M115290 |
| SMNS Z-MAM 5016 | M | *Canis aureus* | Artec Spider | https://doi.org/10.17602/M2/M115292 |
| NHMUK ZD 1987.1 | F | *Canis latrans* | Artec Spider | https://doi.org/10.17602/M2/M114672 |
| SMNS Z-MAM 18994 | U | *Canis latrans* | Artec Spider | https://doi.org/10.17602/M2/M115316 |
| SMNS Z-MAM 51589 | U | *Canis latrans* | Artec Spider | https://doi.org/10.17602/M2/M115317 |
| ZMB Mam 35327 | F | *Canis latrans* | Artec Spider | https://doi.org/10.17602/M2/M115893 |
| SMNS Z-MAM 1174 | F | *Canis lupaster* | Artec Spider | https://doi.org/10.17602/M2/M115283 |
| SMNS Z-MAM 19006 | M | *Canis lupaster* | Artec Spider | https://doi.org/10.17602/M2/M115284 |
| SMNS Z-MAM 31972 | M | *Canis lupaster* | Artec Spider | https://doi.org/10.17602/M2/M115288 |
| SMNS Z-MAM 51593 | F | *Canis lupaster* | Artec Spider | https://doi.org/10.17602/M2/M115289 |
| SMNS Z-MAM 004973 | F | *Canis lupus* | Artec Spider | https://doi.org/10.17602/M2/M115318 |
| USNM 168440 | M | *Canis lupus* | Artec Spider | https://doi.org/10.17602/M2/M117236 |

| | | | | |
|---|---|---|---|---|
| ZMB Mam 22392 | U | *Canis lupus* | Artec Spider | https://doi.org/10.17602/M2/M115894 |
| ZMB Mam 28797 | F | *Canis lupus* | Artec Spider | https://doi.org/10.17602/M2/M115946 |
| NHMUK ZD 1924.8.7.10 | F | *Canis simensis* | Artec Spider | https://doi.org/10.17602/M2/M114673 |
| NHMUK ZD 1936.5.20.4 | F | *Canis simensis* | Artec Spider | https://doi.org/10.17602/M2/M114674 |
| ZMB Mam 52489 | M | *Canis simensis* | Artec Spider | https://doi.org/10.17602/M2/M115947 |
| ZMB Mam 69300 | U | *Canis simensis* | Artec Spider | https://doi.org/10.17602/M2/M115948 |
| DMNH 15719 | M | *Caracal caracal* | CT | https://doi.org/10.17602/M2/M114727 |
| DMNH 873 | M | *Caracal caracal* | CT | https://doi.org/10.17602/M2/M117244 |
| DMNH 876 | F | *Caracal caracal* | CT | https://doi.org/10.17602/M2/M114728 |
| DMNH 877 | F | *Caracal caracal* | CT | https://doi.org/10.17602/M2/M114729 |
| AMNH 37482 | M | *Chironectes minimus* | Artec Spider | https://doi.org/10.17602/M2/M114637 |
| AMNH 96760 | M | *Chironectes minimus* | Artec Spider | https://doi.org/10.17602/M2/M114638 |
| USNM 305167 | F | *Chironectes minimus* | Artec Spider | https://doi.org/10.17602/M2/M117237 |
| USNM 517239 | F | *Chironectes minimus* | Artec Spider | https://doi.org/10.17602/M2/M117238 |
| SMNS Z-MAM 50753 | F | *Chrysocyon brachyurus* | Artec Spider | https://doi.org/10.17602/M2/M115319 |
| ZMB Mam 44198 | M | *Chrysocyon brachyurus* | Artec Spider | https://doi.org/10.17602/M2/M115949 |
| ZMB Mam 44989 | U | *Chrysocyon brachyurus* | Artec Spider | https://doi.org/10.17602/M2/M115950 |
| ZMB Mam 62102 | F | *Chrysocyon brachyurus* | Artec Spider | https://doi.org/10.17602/M2/M115951 |
| DMNH 1190 | M | *Civettictis civetta* | CT | https://doi.org/10.17602/M2/M114733 |
| DMNH 17711 | F | *Civettictis civetta* | CT | https://doi.org/10.17602/M2/M114734 |
| DMNH 26705 | F | *Civettictis civetta* | CT | https://doi.org/10.17602/M2/M114735 |
| DMNH 3174 | M | *Civettictis civetta* | CT | https://doi.org/10.17602/M2/M114736 |
| DMNH 19370 | M | *Crocuta crocuta* | CT | https://doi.org/10.17602/M2/M114737 |
| DMNH 3269 | F | *Crocuta crocuta* | CT | https://doi.org/10.17602/M2/M114738 |
| SMNS Z-MAM 31174 | U | *Crocuta crocuta* | Artec Spider | https://doi.org/10.17602/M2/M115320 |
| SMNS Z-MAM 8060 | M | *Crocuta crocuta* | Artec Spider | https://doi.org/10.17602/M2/M115321 |
| AMNH 100463 | U | *Cryptoprocta ferox* | Artec Spider | https://doi.org/10.17602/M2/M114639 |
| AMNH 188213 | M | *Cryptoprocta ferox* | Artec Spider | https://doi.org/10.17602/M2/M114640 |
| AMNH 199544 | U | *Cryptoprocta ferox* | Artec Spider | https://doi.org/10.17602/M2/M114641 |
| SMNS Z-MAM 21615 | U | *Cryptoprocta ferox* | Artec Spider | https://doi.org/10.17602/M2/M115322 |

| | | | | |
|---|---|---|---|---|
| ZMB Mam 13524 | M | *Cuon alpinus* | Artec Spider | https://doi.org/10.17602/M2/M115952 |
| ZMB Mam 52519 | F | *Cuon alpinus* | Artec Spider | https://doi.org/10.17602/M2/M115953 |
| ZMB Mam 56621 | M | *Cuon alpinus* | Artec Spider | https://doi.org/10.17602/M2/M115954 |
| ZMB Mam 56622 | F | *Cuon alpinus* | Artec Spider | https://doi.org/10.17602/M2/M115955 |
| NMV C 31560 | M | *Dasyurus geoffroii* | Artec Spider | https://doi.org/10.17602/M2/M115136 |
| SAM M 79 | F | *Dasyurus geoffroii* | Artec Spider | https://doi.org/10.17602/M2/M115272 |
| WAM M 1106 | M | *Dasyurus geoffroii* | Artec Spider | https://doi.org/10.17602/M2/M115881 |
| WAM M 1294 | F | *Dasyurus geoffroii* | Artec Spider | https://doi.org/10.17602/M2/M115882 |
| NMV C 17713 | M | *Dasyurus hallucatus* | Artec Spider | https://doi.org/10.17602/M2/M115137 |
| WAM M 12410 | F | *Dasyurus hallucatus* | Artec Spider | https://doi.org/10.17602/M2/M115883 |
| WAM M 7161 | M | *Dasyurus hallucatus* | Artec Spider | https://doi.org/10.17602/M2/M115884 |
| WAM M 7168 | F | *Dasyurus hallucatus* | Artec Spider | https://doi.org/10.17602/M2/M115885 |
| NMV C 14721 | M | *Dasyurus maculatus* | Artec Spider | https://doi.org/10.17602/M2/M115138 |
| NMV C 6107 | F | *Dasyurus maculatus* | Artec Spider | https://doi.org/10.17602/M2/M115139 |
| NMV C 6119 | F | *Dasyurus maculatus* | Artec Spider | https://doi.org/10.17602/M2/M115140 |
| WAM M 3470 | M | *Dasyurus maculatus* | Artec Spider | https://doi.org/10.17602/M2/M115886 |
| NMV DTC 530 | M | *Dasyurus viverrinus* | Artec Spider | https://doi.org/10.17602/M2/M115142 |
| SAM M 7217 | F | *Dasyurus viverrinus* | Artec Spider | https://doi.org/10.17602/M2/M115275 |
| SAM M 7221 | M | *Dasyurus viverrinus* | Artec Spider | https://doi.org/10.17602/M2/M115276 |
| WAM M 6559 | F | *Dasyurus viverrinus* | Artec Spider | https://doi.org/10.17602/M2/M115887 |
| AMNH 133002 | M | *Didelphis marsupialis* | Artec Spider | https://doi.org/10.17602/M2/M114642 |
| AMNH 133007 | F | *Didelphis marsupialis* | Artec Spider | https://doi.org/10.17602/M2/M114643 |
| NHMUK ZD 1984.374 | F | *Didelphis marsupialis* | Artec Spider | https://doi.org/10.17602/M2/M114675 |
| NHMUK ZD 1899.8.1.18 | M | *Didelphis marsupialis* | Artec Spider | https://doi.org/10.17602/M2/M114676 |
| AM M 18851 | M | Dingo | Artec Spider | https://doi.org/10.17602/M2/M114634 |
| AM M 18970 | F | Dingo | Artec Spider | https://doi.org/10.17602/M2/M114635 |
| WAM M 3831 | F | Dingo | Artec Spider | https://doi.org/10.17602/M2/M115879 |
| WAM M 5261 | M | Dingo | Artec Spider | https://doi.org/10.17602/M2/M115880 |
| DMNH 10927 | M | *Felis lybica* | CT | https://doi.org/10.17602/M2/M114739 |
| DMNH 10930 | F | *Felis lybica* | CT | https://doi.org/10.17602/M2/M114740 |

| | | | | |
|---|---|---|---|---|
| DMNH 17016 | M | *Felis lybica* | CT | https://doi.org/10.17602/M2/M114797 |
| DMNH 6154 | F | *Felis lybica* | CT | https://doi.org/10.17602/M2/M114798 |
| SMNS Z-MAM 24104 | F | *Galerella sanguinea* | Artec Spider | https://doi.org/10.17602/M2/M115323 |
| SMNS Z-MAM 4396 | F | *Galerella sanguinea* | Artec Spider | https://doi.org/10.17602/M2/M115324 |
| SMNS Z-MAM 4398 | M | *Galerella sanguinea* | Artec Spider | https://doi.org/10.17602/M2/M115325 |
| SMNS Z-MAM 4399 | M | *Galerella sanguinea* | Artec Spider | https://doi.org/10.17602/M2/M115326 |
| SMNS Z-MAM 4412 | F | *Genetta maculata* | Artec Spider | https://doi.org/10.17602/M2/M115442 |
| SMNS Z-MAM 4416 | F | *Genetta maculata* | Artec Spider | https://doi.org/10.17602/M2/M115443 |
| SMNS Z-MAM 4425 | M | *Genetta maculata* | Artec Spider | https://doi.org/10.17602/M2/M115444 |
| SMNS Z-MAM 4427 | M | *Genetta maculata* | Artec Spider | https://doi.org/10.17602/M2/M115445 |
| MSU 10149 | F | *Gulo gulo* | Artec Spider | https://doi.org/10.17602/M2/M114831 |
| MSU 3844 | U | *Gulo gulo* | Artec Spider | https://doi.org/10.17602/M2/M114832 |
| SMNS Z-MAM 51682 | U | *Gulo gulo* | Artec Spider | https://doi.org/10.17602/M2/M115446 |
| SMNS Z-MAM 6833 | U | *Gulo gulo* | Artec Spider | https://doi.org/10.17602/M2/M115447 |
| ZMB Mam 21295 | M | *Herpailurus yagouaroundi* | Artec Spider | https://doi.org/10.17602/M2/M115956 |
| ZMB Mam 21297 | U | *Herpailurus yagouaroundi* | Artec Spider | https://doi.org/10.17602/M2/M115957 |
| ZMB Mam 5815 | M | *Herpailurus yagouaroundi* | Artec Spider | https://doi.org/10.17602/M2/M115958 |
| ZMB Mam 5816 | F | *Herpailurus yagouaroundi* | Artec Spider | https://doi.org/10.17602/M2/M115959 |
| SMNS Z-MAM 26251 | U | *Leopardus pardalis* | Artec Spider | https://doi.org/10.17602/M2/M115448 |
| SMNS Z-MAM 40178 | U | *Leopardus pardalis* | Artec Spider | https://doi.org/10.17602/M2/M115449 |
| SMNS Z-MAM 6970 | F | *Leopardus pardalis* | Artec Spider | https://doi.org/10.17602/M2/M115450 |
| DMNH 2295 | M | *Leptailurus serval* | CT | https://doi.org/10.17602/M2/M114812 |
| DMNH 93 | U | *Leptailurus serval* | CT | https://doi.org/10.17602/M2/M114813 |
| SMNS Z-MAM 18897 | M | *Leptailurus serval* | Artec Spider | https://doi.org/10.17602/M2/M115451 |
| SMNS Z-MAM 18903 | F | *Leptailurus serval* | Artec Spider | https://doi.org/10.17602/M2/M115452 |
| DMNH 1001 | M | *Lupulella adustus* | CT | https://doi.org/10.17602/M2/M114725 |
| DMNH 10907 | M | *Lupulella adustus* | CT | https://doi.org/10.17602/M2/M114726 |
| SMNS Z-MAM 19004 | F | *Lupulella adustus* | Artec Spider | https://doi.org/10.17602/M2/M115281 |
| SMNS Z-MAM 19005 | F | *Lupulella adustus* | Artec Spider | https://doi.org/10.17602/M2/M115282 |
| DMNH 12002 | M | *Lupulella mesomelas* | CT | https://doi.org/10.17602/M2/M114730 |

| | | | | |
|---|---|---|---|---|
| DMNH 12013 | F | *Lupulella mesomelas* | CT | https://doi.org/10.17602/M2/M114731 |
| DMNH 24017 | F | *Lupulella mesomelas* | CT | https://doi.org/10.17602/M2/M117245 |
| DMNH 4424 | M | *Lupulella mesomelas* | CT | https://doi.org/10.17602/M2/M114732 |
| AMNH 210420 | M | *Lutreolina crassicaudata* | Artec Spider | https://doi.org/10.17602/M2/M114644 |
| AMNH 254513 | F | *Lutreolina crassicaudata* | Artec Spider | https://doi.org/10.17602/M2/M114645 |
| NHMUK ZD 1917.1.25.69 | F | *Lutreolina crassicaudata* | Artec Spider | https://doi.org/10.17602/M2/M114677 |
| NHMUK ZD 1920.12.18.36 | M | *Lutreolina crassicaudata* | Artec Spider | https://doi.org/10.17602/M2/M114678 |
| SMNS Z-MAM 5692 | U | *Lycalopex culpaeus* | Artec Spider | https://doi.org/10.17602/M2/M115453 |
| ZMB Mam 77063 | F | *Lycalopex culpaeus* | Artec Spider | https://doi.org/10.17602/M2/M115960 |
| ZMB Mam 77106 | M | *Lycalopex culpaeus* | Artec Spider | https://doi.org/10.17602/M2/M115961 |
| ZMB Mam 77108 | F | *Lycalopex culpaeus* | Artec Spider | https://doi.org/10.17602/M2/M115962 |
| ZMB Mam 77031 | M | *Lycalopex gymnocercus* | Artec Spider | https://doi.org/10.17602/M2/M115963 |
| ZMB Mam 77033 | M | *Lycalopex gymnocercus* | Artec Spider | https://doi.org/10.17602/M2/M115964 |
| ZMB Mam 77035 | F | *Lycalopex gymnocercus* | Artec Spider | https://doi.org/10.17602/M2/M115965 |
| ZMB Mam 77050 | F | *Lycalopex gymnocercus* | Artec Spider | https://doi.org/10.17602/M2/M115966 |
| DMNH 11895 | U | *Lycaon pictus* | CT | https://doi.org/10.17602/M2/M114814 |
| DMNH 2244 | M | *Lycaon pictus* | CT | https://doi.org/10.17602/M2/M114815 |
| DMNH 47678 | M | *Lycaon pictus* | CT | https://doi.org/10.17602/M2/M114816 |
| SMNS Z-MAM 4460 | F | *Lycaon pictus* | Artec Spider | https://doi.org/10.17602/M2/M115456 |
| SMNS Z-MAM 1870 | F | *Lynx lynx* | Artec Spider | https://doi.org/10.17602/M2/M115454 |
| SMNS Z-MAM 18860 | F | *Lynx lynx* | Artec Spider | https://doi.org/10.17602/M2/M115455 |
| ZMB Mam 16997 | U | *Lynx lynx* | Artec Spider | https://doi.org/10.17602/M2/M115967 |
| SMNS Z-MAM 21806 | U | *Martes martes* | Artec Spider | https://doi.org/10.17602/M2/M115457 |
| SMNS Z-MAM 21808 | M | *Martes martes* | Artec Spider | https://doi.org/10.17602/M2/M115458 |
| SMNS Z-MAM 46570 | F | *Martes martes* | Artec Spider | https://doi.org/10.17602/M2/M115799 |
| SMNS Z-MAM 47060 | M | *Martes martes* | Artec Spider | https://doi.org/10.17602/M2/M115800 |
| SMNS Z-MAM 21879 | U | *Mephitis mephitis* | Artec Spider | https://doi.org/10.17602/M2/M115801 |
| SMNS Z-MAM 21881 | U | *Mephitis mephitis* | Artec Spider | https://doi.org/10.17602/M2/M115802 |
| WAM M 245 | M | *Mephitis mephitis* | Artec Spider | https://doi.org/10.17602/M2/M115888 |
| SMNS Z-MAM 21831 | U | *Neovison vison* | Artec Spider | https://doi.org/10.17602/M2/M115803 |

| | | | | |
|---|---|---|---|---|
| SMNS Z-MAM 32536 | U | *Neovison vison* | Artec Spider | https://doi.org/10.17602/M2/M115804 |
| SMNS Z-MAM 51570 | U | *Neovison vison* | Artec Spider | https://doi.org/10.17602/M2/M115805 |
| DMNH 16786 | M | *Otocyon megalotis* | CT | https://doi.org/10.17602/M2/M114817 |
| DMNH 27297 | F | *Otocyon megalotis* | CT | https://doi.org/10.17602/M2/M114819 |
| ZMB Mam 35581 | U | *Panthera onca* | Artec Spider | https://doi.org/10.17602/M2/M115968 |
| ZMB Mam 47996 | M | *Panthera onca* | Artec Spider | https://doi.org/10.17602/M2/M115969 |
| ZMB Mam 56263 | U | *Panthera onca* | Artec Spider | https://doi.org/10.17602/M2/M115970 |
| ZMB Mam 56264 | U | *Panthera onca* | Artec Spider | https://doi.org/10.17602/M2/M115971 |
| DMNH 13276 | F | *Panthera pardus* | CT | https://doi.org/10.17602/M2/M114825 |
| SMNS Z-MAM 18957 | M | *Panthera pardus* | Artec Spider | https://doi.org/10.17602/M2/M115806 |
| SMNS Z-MAM 18959 | F | *Panthera pardus* | Artec Spider | https://doi.org/10.17602/M2/M115807 |
| SMNS Z-MAM 6854 | M | *Panthera pardus* | Artec Spider | https://doi.org/10.17602/M2/M115808 |
| ZMB Mam 14501 | F | *Panthera uncia* | Artec Spider | https://doi.org/10.17602/M2/M115972 |
| ZMB Mam 18434 | F | *Panthera uncia* | Artec Spider | https://doi.org/10.17602/M2/M115973 |
| ZMB Mam 43160 | M | *Panthera uncia* | Artec Spider | https://doi.org/10.17602/M2/M115974 |
| ZMB Mam 47690 | M | *Panthera uncia* | Artec Spider | https://doi.org/10.17602/M2/M115975 |
| DMNH 2387 | F | *Parahyaena brunnea* | CT | https://doi.org/10.17602/M2/M114823 |
| DMNH 25430 | M | *Parahyaena brunnea* | CT | https://doi.org/10.17602/M2/M114824 |
| DMNH 56B | F | *Parahyaena brunnea* | CT | https://doi.org/10.17602/M2/M117239 |
| DMNH 603 | M | *Parahyaena brunnea* | CT | https://doi.org/10.17602/M2/M117242 |
| AMNH 203347 | F | *Philander opossum* | Artec Spider | https://doi.org/10.17602/M2/M114646 |
| AMNH 24232 | F | *Philander opossum* | Artec Spider | https://doi.org/10.17602/M2/M114647 |
| AMNH 61608 | M | *Philander opossum* | Artec Spider | https://doi.org/10.17602/M2/M114648 |
| AMNH 96714 | M | *Philander opossum* | Artec Spider | https://doi.org/10.17602/M2/M114649 |
| SMNS Z-MAM 21764 | U | *Procyon lotor* | Artec Spider | https://doi.org/10.17602/M2/M115809 |
| SMNS Z-MAM 51565 | M | *Procyon lotor* | Artec Spider | https://doi.org/10.17602/M2/M115810 |
| SMNS Z-MAM 51573 | M | *Procyon lotor* | Artec Spider | https://doi.org/10.17602/M2/M115811 |
| DMNH 2151 | F | *Proteles cristata* | CT | https://doi.org/10.17602/M2/M114826 |
| DMNH 2152 | M | *Proteles cristata* | CT | https://doi.org/10.17602/M2/M114827 |
| DMNH 37169 | F | *Proteles cristata* | CT | https://doi.org/10.17602/M2/M114828 |

| | | | | |
|---|---|---|---|---|
| ZMB Mam 45001 | M | *Proteles cristata* | Artec Spider | https://doi.org/10.17602/M2/M116019 |
| ZMB Mam 13002 | F | *Puma concolor* | Artec Spider | https://doi.org/10.17602/M2/M116020 |
| ZMB Mam 14482 | F | *Puma concolor* | Artec Spider | https://doi.org/10.17602/M2/M116021 |
| ZMB Mam 37691 | M | *Puma concolor* | Artec Spider | https://doi.org/10.17602/M2/M116022 |
| ZMB Mam 72929 | U | *Puma concolor* | Artec Spider | https://doi.org/10.17602/M2/M116023 |
| NMV C 17712 | M | *Sarcophilus harrisii* | Artec Spider | https://doi.org/10.17602/M2/M115145 |
| NMV C 6251 | M | *Sarcophilus harrisii* | Artec Spider | https://doi.org/10.17602/M2/M115150 |
| WAM M 16592 | F | *Sarcophilus harrisii* | Artec Spider | https://doi.org/10.17602/M2/M115889 |
| WAM M 8336 | F | *Sarcophilus harrisii* | Artec Spider | https://doi.org/10.17602/M2/M115890 |
| SMNS Z-MAM 19136 | U | *Speothos venaticus* | Artec Spider | https://doi.org/10.17602/M2/M115812 |
| ZMB Mam 31003 | U | *Speothos venaticus* | Artec Spider | https://doi.org/10.17602/M2/M116024 |
| ZMB Mam 4680 | F | *Speothos venaticus* | Artec Spider | https://doi.org/10.17602/M2/M116025 |
| AM M 19465 | M | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M114636 |
| NHMUK ZD 1839.6.11.3 | F | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M114679 |
| NHMUK ZD 1846.4.4.1 | M | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M114680 |
| NHMUK ZD 1852.1.16.7 | F | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M114681 |
| NHMUK ZD 1972.665 | M | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M114682 |
| NHMUK ZD 1972.666 | F | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M114683 |
| NMV C 5742 | F | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M115159 |
| NMV C 5749 | M | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M115160 |
| SAM M 1953 | M | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M115277 |
| SAM M 1959 | F | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M115278 |
| SAM M 922 | F | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M115279 |
| SAM M 95 | M | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M115280 |
| TMAG 321 | M | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M115876 |
| UMZC A673 | M | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M115877 |
| UMZC A678 | F | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M115878 |
| WAM M 195 | U | *Thylacinus cynocephalus* | Artec Spider | https://doi.org/10.17602/M2/M115891 |
| AMNH 1298 | M | *Urocyon cinereoargenteus* | Artec Spider | https://doi.org/10.17602/M2/M114650 |
| AMNH 255648 | F | *Urocyon cinereoargenteus* | Artec Spider | https://doi.org/10.17602/M2/M114651 |

| | | | | |
|---|---|---|---|---|
| AMNH 32302 | F | *Urocyon cinereoargenteus* | Artec Spider | https://doi.org/10.17602/M2/M114652 |
| NMV C 11222 | M | *Urocyon cinereoargenteus* | Artec Spider | https://doi.org/10.17602/M2/M115161 |
| SMNS Z-MAM 2257 | F | *Viverra tangalunga* | Artec Spider | https://doi.org/10.17602/M2/M115814 |
| SMNS Z-MAM 2507 | U | *Viverra zibetha* | Artec Spider | https://doi.org/10.17602/M2/M115815 |
| SMNS Z-MAM 21594 | U | *Viverricula indica* | Artec Spider | https://doi.org/10.17602/M2/M115813 |
| WAM 30616 | U | *Viverricula indica* | Artec Spider | https://doi.org/10.17602/M2/M115892 |
| ZMB Mam 103828 | M | *Vulpes lagopus* | Artec Spider | https://doi.org/10.17602/M2/M116032 |
| ZMB Mam 2205 | F | *Vulpes lagopus* | Artec Spider | https://doi.org/10.17602/M2/M116033 |
| ZMB Mam 65305 | F | *Vulpes lagopus* | Artec Spider | https://doi.org/10.17602/M2/M116034 |
| ZMB Mam 65324 | M | *Vulpes lagopus* | Artec Spider | https://doi.org/10.17602/M2/M116035 |
| DMNH 1193 | M | *Vulpes chama* | CT | https://doi.org/10.17602/M2/M114829 |
| DMNH 1493 | M | *Vulpes chama* | CT | https://doi.org/10.17602/M2/M114830 |
| ZMB Mam 25253 | U | *Vulpes rueppellii* | Artec Spider | https://doi.org/10.17602/M2/M116026 |
| ZMB Mam 49961 | M | *Vulpes rueppellii* | Artec Spider | https://doi.org/10.17602/M2/M116027 |
| ZMB Mam 6080 | U | *Vulpes rueppellii* | Artec Spider | https://doi.org/10.17602/M2/M116028 |
| ZMB Mam 91331 | U | *Vulpes rueppellii* | Artec Spider | https://doi.org/10.17602/M2/M116029 |
| NMV C 25076 | M | *Vulpes vulpes* | Artec Spider | https://doi.org/10.17602/M2/M115162 |
| SMNS Z-MAM 31949 | M | *Vulpes vulpes* | Artec Spider | https://doi.org/10.17602/M2/M115816 |
| ZMB Mam 43558 | F | *Vulpes vulpes* | Artec Spider | https://doi.org/10.17602/M2/M116030 |
| ZMB Mam 65666 | F | *Vulpes vulpes* | Artec Spider | https://doi.org/10.17602/M2/M116031 |

**Table S7.** References for phylogenetic hypotheses presented in **Figure 8.**


Beck, R. M. D. & Taglioretti, M. L. A nearly complete juvenile skull of the marsupial *Sparassocynus derivatus* from the Pliocene of Argentina, the affinities of "Sparassocynids", and the diversification of opossums (Marsupialia; Didelphimorphia; Didelphidae). *Journal of Mammalian Evolution*, doi:10.1007/s10914-019-09471-y (2019).

Eizirik, E. *et al.* Pattern and timing of diversification of the mammalian order Carnivora inferred from multiple nuclear gene sequences. *Molecular Phylogenetics and Evolution* 56, 49-63, doi:10.1016/j.ympev.2010.01.033 (2010).

Johnson, W. E. *et al.* The late Miocene radiation of modern Felidae: A genetic assessment. *Science* 311, 73-77, doi:10.1126/science.1122277 (2006).

Kealy, S. & Beck, R. Total evidence phylogeny and evolutionary timescale for Australian faunivorous marsupials (Dasyuromorphia). *BMC Evolutionary Biology* 17, 1-23 (2017).

Koepfli, K.-P. *et al.* Molecular systematics of the Hyaenidae: relationships of a relictual lineage resolved by a molecular supermatrix. *Molecular Phylogenetics and Evolution* 38, 603-620 (2006).

Koepfli, K. *et al.* Genome-wide evidence reveals that African and Eurasian golden jackals are distinct species. *Current Biology* 25, 2158-2165 (2015).

Law, C. J., Slater, G. J. & Mehta, R. S. Lineage diversity and size disparity in Musteloidea: Testing patterns of adaptive radiation using molecular and fossil-based methods. *Systematic Biology* 67, 127-144, doi:10.1093/sysbio/syx047 (2018).

Mitchell, K. J. *et al.* Molecular phylogeny, biogeography, and habitat preference evolution of marsupials. *Molecular Biology and Evolution* 31, 2322-2330, doi:10.1093/molbev/msu176 (2014).

Perini, F. A., Russo, C. A. M. & Schrago, C. G. The evolution of South American endemic canids: a history of rapid diversification and morphological parallelism. *Journal of Evolutionary Biology* 23, 311-322, doi:10.1111/j.1420-9101.2009.01901.x (2010).

Piras, P. *et al.* Evolution of the sabertooth mandible: A deadly ecomorphological specialization. *Palaeogeography, Palaeoclimatology, Palaeoecology* 496, 166-174, doi:https://doi.org/10.1016/j.palaeo.2018.01.034 (2018).

Rovinsky, D. S., Evans, A. R. & Adams, J. W. The pre-Pleistocene fossil thylacinids (Dasyuromorphia: Thylacinidae) and the evolutionary context of the modern thylacine. *PeerJ* 7, e7457, doi:10.7717/peerj.7457 (2019).

Slater, G. J. & Friscia, A. R. Hierarchy in adaptive radiation: A case study using the Carnivora (Mammalia). *Evolution* 73, 524-539, doi:10.1111/evo.13689 (2019).

Slater, G. J., Harmon, L. J. & Alfaro, M. E. Integrating fossils with molecular phylogenies improves inference of trait evolution. *Evolution* 66, 3931-3944, doi:10.1111/j.1558-5646.2012.01723.x (2012).

Tchaicka, L. *et al.* Molecular assessment of the phylogeny and biogeography of a recently diversified endemic group of South American canids (Mammalia: Carnivora: Canidae). *Genetics and Molecular Biology* 39, 442-451, doi:10.1590/1678-4685-GMB-2015-0189 (2016).

Zhao, C., Zhang, H., Liu, G., Yang, X. & Zhang, J. The complete mitochondrial genome of the Tibetan fox (*Vulpes ferrilata*) and implications for the phylogeny of Canidae. *Comptes Rendus Biologies* 339, 68-77, doi:https://doi.org/10.1016/j.crvi.2015.11.005 (2016).

Zhou, Y., Wang, S.-R. & Ma, J.-Z. Comprehensive species set revealing the phylogeny and biogeography of Feliformia (Mammalia, Carnivora) based on mitochondrial DNA. *PLoS ONE* 12, e0174902, doi:10.1371/journal.pone.0174902 (2017).

**Table S8.** 3D GM landmark protocol and definitions.

| Point | Definition | Type | Paired | Semi-landmarks |
|---|---|---|---|---|
| 1 | Anteriormost extent of premaxilla at midline (Prosthion) | Fixed | - | - |
| 2 | Anteriormost nasal (L) | Fixed | yes | - |
| 3 | Anteriormost nasal (R) | Fixed | yes | - |
| 4 | Anterior nasopremaxilla (L) | Fixed | yes | - |
| 5 | Anterior nasopremaxilla (R) | Fixed | yes | - |
| 6 | Mesial canine alveolar margin in lateral view (L) | Fixed | yes | - |
| 7 | Mesial canine alveolar margin in lateral view (R) | Fixed | yes | - |
| 8 | Distal canine alveolar margin in lateral view (L) | Fixed | yes | - |
| 9 | Distal canine alveolar margin in lateral view (R) | Fixed | yes | - |
| 10 | Midline at point coplanar with & dorsal to 8/9 | Fixed | - | - |
| 11 | Midline at posterior edge of incisive foramen | Fixed | - | - |
| 12 | Distal alveolar margin of P3 in lateral view (L) | Fixed | yes | - |
| 13 | Distal alveolar margin of P3 in lateral view (R) | Fixed | yes | - |
| 14 | Dorsal border of infraorbital foramen (L) | Fixed | yes | - |
| 15 | Dorsal border of infraorbital foramen (R) | Fixed | yes | - |
| 16 | Ventral border of infraorbital foramen (L) | Fixed | yes | - |
| 17 | Ventral border of infraorbital foramen (R) | Fixed | yes | - |
| 18 | Mesial alveolar margin of carnassial in lateral view (L) | Fixed | yes | - |
| 19 | Mesial alveolar margin of carnassial in lateral view (R) | Fixed | yes | - |
| 20 | Distal alveolar margin of carnassial in lateral view (L) | Fixed | yes | - |
| 21 | Distal alveolar margin of carnassial in lateral view (R) | Fixed | yes | - |
| 22 | Postorbital process (L) | Fixed | yes | - |
| 23 | Postorbital process (R) | Fixed | yes | - |
| 24 | Midline at point in line with 22/23 | Fixed | - | - |
| 25 | Postorbital process of zygomatic (R) | Fixed | yes | - |
| 26 | Postorbital process of zygomatic (L) | Fixed | yes | - |
| 27 | Ventrodistal inflection of jugal with maxilla (R) | Fixed | yes | - |
| 28 | Ventrodistal inflection of jugal with maxilla (L) | Fixed | yes | - |
| 29 | Midline at distalmost interpalatine | Fixed | - | - |
| 30 | Anterolateral point of glenoid on squamosal (L) | Fixed | yes | - |
| 31 | Anterolateral point of glenoid on squamosal (R) | Fixed | yes | - |
| 32 | Anteromedial point of glenoid on squamosal (L) | Fixed | yes | - |
| 33 | Anteromedial point of glenoid on squamosal (R) | Fixed | yes | - |
| 34 | Midline of basicranium at anterior extent of auditory bullae | Fixed | - | - |
| 35 | Posterior inflection of zygomatic with neurocranium (R) | Fixed | yes | - |
| 36 | Posterior inflection of zygomatic with neurocranium (L) | Fixed | yes | - |
| 37 | Lateralmost point of nuchal crest (R) | Fixed | yes | - |
| 38 | Lateralmost point of nuchal crest (L) | Fixed | yes | - |
| 39 | Ventralmost point of mastoid process (R) | Fixed | yes | - |
| 40 | Ventralmost point of mastoid process (L) | Fixed | yes | - |
| 41 | Ventralmost point of paracondylar process (R) | Fixed | yes | - |
| 42 | Ventralmost point of paracondylar process (L) | Fixed | yes | - |
| 43 | Ventral border of foramen magnum at midline (Basion) | Fixed | - | - |
| 44 | Dorsal border of foramen magnum at midline (Opisthion) | Fixed | - | - |
| 45 | Confluence of temporal and nuchal crests (R) | Fixed | yes | - |
| 46 | Confluence of temporal and nuchal crests (L) | Fixed | yes | - |
| C1 | Curve between points 10 & 26 (dorsum of rostrum) | Curve | - | 9 |

| | | | | |
|---|---|---|---|---|
| C2 | Curve between points 11 % 29 (palatal curve) | Curve | - | 9 |
| C3 | Curve between points 9 & 10 (rostral arc at canine) | Curve | - | 5 |
| C4 | Curve between points 8 & 10 (rostral arc at canine) | Curve | - | 5 |
| C5 | Curve between points 9 & 13 (alveolar margin) | Curve | - | 5 |
| C6 | Curve between points 8 & 12 (alveolar margin) | Curve | - | 5 |
| C7 | Curve between points 23 & 25 (orbital rim R) | Curve | - | 11 |
| C8 | Curve between points 22 & 26 (orbital rim L) | Curve | - | 11 |
| C9 | Curve between point 15 & anterior rim of orbit (dorsal infraorbital foramen R) | Curve | - | 3 |
| C10 | Curve between point 14 & anterior rim of orbit (dorsal infraorbital foramen R) | Curve | - | 3 |
| C11 | Curve between points 17 & 13 (ventral infraorbital foramen R) | Curve | - | 3 |
| C12 | Curve between points 16 & 12 (ventral infraorbital foramen L) | Curve | - | 3 |
| C13 | Curve between points 25 & 35 (dorsal zygomatic border R) | Curve | - | 13 |
| C14 | Curve between points 26 & 36 (dorsal zygomatic border L) | Curve | - | 13 |
| C15 | Curve between points 27 & 31 (ventral zygomatic border R) | Curve | - | 11 |
| C16 | Curve between points 28 & 30 (ventral zygomatic border L) | Curve | - | 11 |
| C17 | Curve between points 31 & 33 (anterior border of glenoid R) | Curve | - | 5 |
| C18 | Curve between points 30 & 32 (anterior border of glenoid L) | Curve | - | 5 |
| C19 | Curve between points 34 & 43 (basicranial curve) | Curve | - | 3 |
| C20 | Curve between 22 & 46 (temporal crest L) | Curve | - | 13 |
| C21 | Curve between 23 & 45 (temporal crest R) | Curve | - | 13 |
| C22 | Curve between 38 & 46 (nuchal crest L) | Curve | - | 9 |
| C23 | Curve between 37 & 45 (nuchal crest R) | Curve | - | 9 |
| C24 | Curve between 22 & 32 (infratemporal crest L) | Curve | - | 7 |
| C25 | Curve between 23 & 33 (infratemporal crest R) | Curve | - | 7 |
| P1 | Patch bordered by c1, c3, c5, c7, c9, c11 (rostal patch R) | Patch | - | 36 |
| P2 | Patch bordered by c1, c4, c6, c8, c10, c12 (rostral patch L) | Patch | - | 36 |
| P3 | Patch bordered by c21, c23, c25 (neurocranial patch R) | Patch | - | 36 |
| P4 | Patch bordered by c20, c22, c24 (neurocranial patch L) | Patch | - | 36 |

Detailed protocol:

Surface meshes were imported into Geomagic Studio 2014 and oriented via the sagittal plane and a horizontal plane defined by the dorsalmost point of the right auditory meatus and the ventralmost point of the left and right orbital rim, producing an orientation similar to Frankfort horizontal (FH). This orientation allowed for placement of functionally analogous fixed landmarks and curve semilandmarks at geometrically definable positions relative to FH. Landmarking of all specimens was performed by DSR in Viewbox 4 (dHAL software, Greece). A landmark template was produced and then used to semi-automate the placement and projection of curve and patch semilandmarks via thin-plate spline warping of the template to the target mesh. A mean landmark configuration was generated from the total dataset, and the semilandmarks of each specimen was then slid on a tangent to the surface or curve spline to minimise bending energy in reference to the mean configuration. The semilandmarks were then projected back onto their respective mesh surface, and the sliding process was repeated six times, further minimising bending energy with each repetition. This procedure was performed five more times, each time generating a mean landmark configuration from the previous iteration, then sliding and projecting onto the respective surface mesh six times. The resulting configurations were then considered to be homologous, and used in the subsequent Procrustes superimposition.

**Table S9.** References for diet, body mass, and prey size. Data can be found on Figshare at https://figshare.com/projects/Convergence_between_the_thylacine_and_small_prey-focused_canids/84905


Abreu KC, Moro-Rios RF, Silva-Pereira JE, Miranda JM, Jablonski EF, and Passos FC. 2008. Feeding habits of ocelot (*Leopardus pardalis*) in Southern Brazil. *Mammalian Biology* 73:407-411. 10.1016/j.mambio.2007.07.004

Andelt WF, Kie JG, Knowlton FF, and Cardwell K. 1987. Variation in coyote diets associated with season and successional changes in vegetation. *Journal of Wildlife Management* 51:273-277.

Angelici FM. 2000. Food habits and resource partitioning of carnivores (Herpestidae, Viverridae) in the rainforests of southeastern Nigeria: preliminary results. *Revue d'Écologie* 55:67-76.

Angelici FM, and Luiselli L. 2005. Habitat associations and dietary relationships between two genets, *Genetta maculata* and *Genetta cristata*. *Revue d'Écologie* 60:341-354.

Anthony RM, Barten NL, and Seiser PE. 2000. Foods of arctic foxes (*Alopex lagopus*) during winter and spring in western Alaska. *Journal of Mammalogy* 81:820-828.

Anwar MB, Jackson R, Nadeem MS, Janečka JE, Hussain S, Beg MA, Muhammad G, and Qayyum M. 2011. Food habits of the snow leopard *Panthera uncia* (Schreber, 1775) in Baltistan, Northern Pakistan. *European Journal of Wildlife Research* 57:1077-1083. 10.1007/s10344-011-0521-2

Atkinson RPD, Macdonald DW, and Kamizola R. 2002. Dietary opportunism in side-striped jackals *Canis adustus* Sundevall. *Journal of Zoology* 257:129-139.

Azevedo F, Lester V, Gorsuch W, Lariviere S, Wirsing A, and Murray D. 2006. Dietary breadth and overlap among five sympatric prairie carnivores. *Journal of Zoology* 269:127-135. 10.1111/j.1469-7998.2006.00075.x

Baker CM. 1989. Feeding habits of the water mongoose (*Atilax paludinosus*). *Zeitschrift für Säugetierkunde* 54:31-39.

Belcher CA. 1995. Diet of the tiger quoll (*Dasyurus maculatus*) in East Gippsland, Victoria. *Wildlife Research* 22:341-357.

Blackhall S. 1980. Diet of the eastern native-cat, *Dasyurus viverrinus* (Shaw), in southern Tasmania. *Wildlife Research* 7:191-197.

Bothma JdP. 1966. Food of the silver fox *Vulpes chama*. *Zoologica Africana* 2:205-209.

Bowland JM, and Perrin M. 1993. Diet of serval *Felis serval* in a highland region of Natal. *African Zoology* 28:132-135.

Braczkowski A, Watson L, Coulson D, Lucas J, Peiser B, and Rossi M. 2012. The diet of caracal, *Caracal caracal*, in two areas of the southern Cape, South Africa as determined by scat analysis. *South African Journal of Wildlife Research* 42:111-116.

Cáceres N, Ghizoni-Jr I, and Graipel M. 2002. Diet of two marsupials, *Lutreolina crassicaudata* and *Micoureus demerarae*, in a coastal Atlantic Forest island of Brazil. *Mammalia* 66:331-340.

Capitani C, Bertelli I, Varuzza P, Scandura M, and Apollonio M. 2004. A comparative analysis of wolf (*Canis lupus*) diet in three different Italian ecosystems. *Mammalian Biology* 69:1-10.

Castelló JR. 2018. *Canids of the world: wolves, wild dogs, foxes, jackals, coyotes, and their relatives.* Princeton: Princeton University Press.

Castillo DF, Birochio DE, Lucherini M, and Casanave EB. 2011. Diet of adults and cubs of *Lycalopex gymnocercus* in Pampas grassland: a validation of the Optimal Foraging Theory? *Annales Zoologici Fennici* 48:251-256.

Castro-Arellano I, Zarza H, and Medellín RA. 2000. *Philander opossum*. *Mammalian Species* 2000:1-8.

Chetri M, Odden M, and Wegge P. 2017. Snow leopard and Himalayan wolf: food habits and prey selection in the Central Himalayas, Nepal. *PLoS ONE* 12:1-16. 10.1371/journal.pone.0170549

Chuang SA, and Lee LL. 1997. Food habits of three carnivore species (*Viverricula indica*, *Herpestes urva*, and *Melogale moschata*) in Fushan Forest, northern Taiwan. *Journal of Zoology* 243:71-79.

Clevenger A. 1993. Pine marten (*Martes martes* Linné, 1758) comparative feeding ecology in an island and mainland population of Spain. *Zeitschrift für Säugetierkunde* 58:212-212.

Colon CP, and Sugau JB. 2012. Notes on the diet of the Malay civet (*Viverra tangalunga*) and other civets in logged and unlogged lowland dipterocarp rain forests in Sabah, Borneo. *Malayan Nature Journal* 64:69-74.

Cooper R, and Skinner J. 1979. Importance of termites in the diet of the aardwolf *Proteles cristatus* in South Africa. *South African Journal of Zoology* 14:5-8.

Cordero G, and Nicolas R. 1987. Feeding habits of the opossum (*Didelphis marsupialis*) in northern Venezuela. *Fieldiana Zoology*:125-131.

Courchamp F, Rasmussen GSA, and Macdonald DW. 2002. Small pack size imposes a trade-off between hunting and pup-guarding in the painted hunting dog *Lycaon pictus*. *Behavioral Ecology* 13:20-27. 10.1093/beheco/13.1.20

Creel S, and Creel NM. 1995. Communal hunting and pack size in African wild dogs, *Lycaon pictus*. *Animal Behaviour* 50:1325-1339.

Dalerum F, Kunkel K, Angerbjörn A, and Shults BS. 2009. Diet of wolverines (*Gulo gulo*) in the western Brooks Range, Alaska. *Polar Research* 28:246-253. 10.1111/j.1751-8369.2008.00090.x

de Oliveira T. 2002. Ecología comparativa de la alimentación del jaguar y del puma en el neotrópico. In: Medellín RA, Equihua C, Chetkiewicz C, Crawshaw Jr P, Rabinowitz A, Redford K, Robinson J, Sanderson E, and Taber A, eds. *El jaguar en el nuevo milenio*. Mexico City: Fondo de Cultura Económica, 265-288.

de Souza Lima E, Jorge RSP, and Dalponte JC. 2009. Habitat use and diet of bush dogs, *Speothos venaticus*, in the Northern Pantanal, Mato Grosso, Brazil. *Mammalia* 73:13-19. 10.1515/MAMM.2009.002

de Villa Meza A, Martinez Meyer E, and López González C. 2002. Ocelot (*Leopardus pardalis*) food habits in a tropical deciduous forest of Jalisco, Mexico. *American Midland Naturalist* 148:146-154.

Dollar L, Ganzhorn JU, and Goodman SM. 2007. Primates and other prey in the seasonally variable diet of *Cryptoprocta ferox* in the dry deciduous forest of western Madagascar. In: Gursky SL, and Nekaris KAI, eds. *Primate anti-predator strategies*. Boston: Springer, 63-76.

Facure KG, and do Nascimento Ramos V. 2011. Food habits of the thick-tailed opossum Lutreolina crassicaudata (Didelphimorphia, Didelphidae) in two urban areas of southeastern Brazil. *Mammalian Biology* 76:234-236. 10.1016/j.mambio.2010.06.005

Farrell LE, Roman J, and Sunquist ME. 2000. Dietary separation of sympatric carnivores identified by molecular analysis of scats. *Molecular Ecology* 9:1583-1590.

Gade-Jørgensen I, and Stagegaard R. 2000. Diet composition of wolves *Canis lupus* in east-central Finland. *Acta Theriologica* 45:537-547.

Galliez M, de Souza Leite M, Queiroz TL, and dos Santos Fernandez FA. 2009. Ecology of the water opossum *Chironectes minimus* in Atlantic forest streams of southeastern Brazil. *Journal of Mammalogy* 90:93-103.

Giannatos G, Karypidou A, Legakis A, and Polymeni R. 2010. Golden jackal (*Canis aureus* L.) diet in Southern Greece. *Mammalian Biology* 75:227-232. 10.1016/j.mambio.2009.03.003

Gilbert F, and Nancekivell E. 1982. Food habits of mink (*Mustela vison*) and otter (*Lutra canadensis*) in northeastern Alberta. *Canadian Journal of Zoology* 60:1282-1288.

Glen A, and Dickman C. 2006. Diet of the spotted-tailed quoll (*Dasyurus maculatus*) in eastern Australia: effects of season, sex and size. *Journal of Zoology* 269:241-248. 10.1111/j.1469-7998.2006.00046.x

Godsell J. 1983. Ecology of the eastern quoll *Dasyurus viverrinus*, (Dasyrudae: Marsupialia) Doctor of Philosophy. Australian National University.

Graw B, and Manser M. 2017. Life history patterns and biology of the slender mongoose (*Galerella sanguinea*) in the Kalahari Desert. *Journal of Mammalogy* 98:332-338. 10.1093/jmammal/gyw178

Hayward M. 2006. Prey preferences of the spotted hyaena (*Crocuta crocuta*) and degree of dietary overlap with the lion (*Panthera leo*). *Journal of Zoology* 270:606-614. 10.1111/j.1469-7998.2006.00183.x

Hayward M, Hofmeyr M, O'brien J, and Kerley G. 2006. Prey preferences of the cheetah (*Acinonyx jubatus*)(Felidae: Carnivora): morphological limitations or the need to capture rapidly consumable prey before kleptoparasites arrive? *Journal of Zoology* 270:615-627. 10.1111/j.1469-7998.2006.00184.x

Hayward MW, Lyngdoh S, and Habib B. 2014. Diet and prey preferences of dholes (*Cuon alpinus*): dietary competition within Asia's apex predator guild. *Journal of Zoology* 294:255-266. 10.1111/jzo.12171

Henschel P, Abernethy K, and White L. 2005. Leopard food habits in the Lopé National Park, Gabon, Central Africa. *African Journal of Ecology* 43:21-28.

Hershkovitz P. 1997. Composition of the family Didelphidae Gray, 1821 (Didelphoidea: Marsupialia), with a review of the morphology and behavior of the included four-eyed pouched opossums of the genus *Philander* Tiedemann, 1808. *Fieldiana Zoology* 86:1-103.

Hockman JG, and Chapman JA. 1983. Comparative feeding habits of red foxes (*Vulpes vulpes*) and gray foxes (*Urocyon cinereoargenteus*) in Maryland. *American Midland Naturalist* 110:276-285. 10.2307/2425269

Holekamp KE, Smale L, Berg R, and Cooper SM. 1997. Hunting rates and hunting success in the spotted hyena (*Crocuta crocuta*). *Journal of Zoology* 242:1-15. 10.1111/j.1469-7998.1997.tb02925.x

Iriarte JA, Franklin WL, Johnson WE, and Redford KH. 1990. Biogeographic variation of food habits and body size of the America puma. *Oecologia* 85:185-190. 10.1007/BF00319400

Jędrzejewski W, and Jędrzejewska B. 1992. Foraging and diet of the red fox *Vulpes vulpes* in relation to variable food resources in Białowieza National Park, Poland. *Ecography* 15:212-220. 10.1111/j.1600-0587.1992.tb00027.x

Johnsingh AJT. 1982. Reproductive and social behaviour of the Dhole, *Cuon alpinus* (Canidae). *Journal of Zoology* 198:443-463. 10.1111/jzo.1982.198.4.443

Johnson KG, Wei W, Reid DG, and Jinchu H. 1993. Food Habits of Asiatic Leopards (*Panthera pardus fusea*) in Wolong Reserve, Sichuan, China. *Journal of Mammalogy* 74:646-650. 10.2307/1382285

Jones ME. 1997. Character displacement in Australian dasyurid carnivores: size relationships and prey size patterns. *Ecology* 78:2569-2587.

Jones ME, and Barmuta LA. 1998. Diet overlap and relative abundance of sympatric dasyurid carnivores: a hypothesis of competition. *Journal of Animal Ecology* 67:410-421.

Kitchen AM, Gese EM, and Schauster ER. 1999. Resource partitioning between coyotes and swift foxes: space, time, and diet. *Canadian Journal of Zoology* 77:1645-1656. 10.1139/z99-143

Klare U, Kamler JF, and Macdonald DW. 2011. The bat-eared fox: A dietary specialist? *Mammalian Biology* 76:646-650. 10.1016/j.mambio.2011.06.005

Klare U, Kamler JF, and Macdonald DW. 2014. Seasonal diet and numbers of prey consumed by Cape foxes *Vulpes chama* in South Africa. *Wildlife Biology* 20:190-195. 10.2981/wlb.00006

Koskela A, Kojola I, Aspi J, and Hyvärinen M. 2013. The diet of breeding female wolverines (*Gulo gulo*) in two areas of Finland. *Acta Theriologica* 58:199-204. 10.1007/s13364-012-0111-z

Landa A, Strand O, Swenson JE, and Skogland T. 1997. Wolverines and their prey in southern Norway. *Canadian Journal of Zoology* 75:1292-1299. 10.1139/z97-153

Lanszki J, and Heltai M. 2002. Feeding habits of golden jackal and red fox in south-western Hungary during winter and spring. *Mammalian Biology* 67:129-136. 10.1078/1616-5047-00020

Larivière S, and Seddon PJ. 2001. *Vulpes rueppelli*. *Mammalian Species* 678:1-5. 10.1644/1545-1410(2001)678<0001:VR>2.0.CO;2

Lindsay IM, and Macdonald DW. 1986. Behaviour and ecology of the Ruppell's fox, *Vulpes ruppelli*, in Oman. *Mammalia* 50:461-474. https://doi.org/10.1515/mamm.1986.50.4.461

Loveridge AJ, and Macdonald DW. 2003. Niche separation in sympatric jackals (*Canis mesomelas* and *Canis adustus*). *Journal of Zoology* 259:143-153. 10.1017/S0952836902003114

Marshall LG. 1978. *Chironectes minimus*. *Mammalian Species*:1-6. 10.2307/0.109.1

McShane TO, and Grettenberger JF. 1984. Food of the golden jackal (*Canis aureus*) in central Niger. *African Journal of Ecology* 22:49-53. 10.1111/j.1365-2028.1984.tb00673.x

Medellín RA. 1991. Ecomorfología del cráneo de cinco didélfidos: tendencias, divergencias e implicaciones. *Anales del Instituto de Biología de la Universidad Nacional Autónoma de México, Serie Zoología* 62:269-286.

Melville HIAS, Bothma JdP, and Mills MGL. 2004. Prey selection by caracal in the Kgalagadi Transfrontier Park. *South African Journal of Wildlife Research* 34:67-75.

Moreno RS, Kays RW, and Samudio R, Jr. 2006. Competitive release in diets of ocelot (*Leopardus pardalis*) and puma (*Puma concolor*) after jaguar (*Panthera onca*) decline. *Journal of Mammalogy* 87:808-816. 10.1644/05-mamm-a-360r2.1

Motta-Junior JC, Talamoni SA, Lombardi JA, and Simokomaki K. 1996. Diet of the maned wolf, *Chrysocyon brachyurus*, in central Brazil. *Journal of Zoology* 240:277-284. 10.1111/j.1469-7998.1996.tb05284.x

Newsome A, Corbett L, Catling P, and Burt R. 1983. The feeding ecology of the dingo. 1. Stomach contents from trapping in south-eastern Australia, and the non-target wildlife also caught in dingo traps. *Wildlife Research* 10:477-486. 10.1071/WR9830477

Oakwood M. 1997. The ecology of the northern quoll, *Dasyurus hallucatus* Doctor of Philosophy. Australian National University.

Odden J, Linnell JDC, and Andersen R. 2006. Diet of Eurasian lynx, *Lynx lynx*, in the boreal forest of southeastern Norway: the relative importance of livestock and hares at low roe deer density. *European Journal of Wildlife Research* 52:237-244. 10.1007/s10344-006-0052-4

Owens MJ, and Owens DD. 1978. Feeding ecology and its influence on social organization in Brown hyenas (*Hyaena brunnea*, Thunberg) of the Central Kalahari Desert. *African Journal of Ecology* 16:113-135. 10.1111/j.1365-2028.1978.tb00433.x

Palmer R, and Fairall N. 1988. Caracal and African wild cat diet in the Karoo National Park and the implications thereof for hyrax. *South African Journal of Wildlife Research* 18:30-34.

Paltridge R. 2002. The diets of cats, foxes and dingoes in relation to prey availability in the Tanami Desert, Northern Territory. *Wildlife Research* 29:389-403. 10.1071/WR00010

Pemberton DA, Gales SB, B, Gales R, Lazenby B, and Medlock K. 2008. The diet of the Tasmanian Devil, *Sarcophilus harrisii*, as determined from analysis of scat and stomach contents. *Papers and Proceedings of the Royal Society of Tasmania* 142:13-22. 10.26749/rstpp.142.2.13

Pollock A. 1999. Notes on status, distribution and diet of northern quoll *Dasyurus hallucatus* in the Mackay-Bowen area, mideastern Queensland. *Australian Zoologist* 31:388-395.

Rabinowitz AR, and Nottingham Jr BG. 1986. Ecology and behaviour of the Jaguar (*Panthera onca*) in Belize, Central America. *Journal of Zoology* 210:149-159. 10.1111/j.1469-7998.1986.tb03627.x

Reed JE, Ballard WB, Gipson PS, Kelly BT, Krausman PR, Wallace MC, and B. WD. 2006. Diets of free-ranging Mexican gray wolves in Arizona and New Mexico. *Wildlife Society Bulletin* 34:1127-1133. 10.2193/0091-7648(2006)34[1127:dofmgw]2.0.co;2

Schaller GB, and Vasconcelos JMC. 1978. Jaguar predation on capybara. *Zeitschrift für Säugetierkunde* 43:296-301.

Schoonover LJ, and Marshall WH. 1951. Food habits of the raccoon (*Procyon lotor hirtus*) in north-central Minnesota. *Journal of Mammalogy* 32:422-428. 10.2307/1375790

Sidorovich VE, Sidorovich AA, and Izotova IV. 2006. Variations in the diet and population density of the red fox *Vulpes vulpes* in the mixed woodlands of northern Belarus. *Mammalian Biology* 71:74-89. 10.1016/j.mambio.2005.12.001

Sillero-Zubiri C, and Gottelli D. 1994. *Canis simensis. Mammalian Species*:1-6. 10.2307/3504136

Sillero-Zubiri C, Hoffmann M, and Macdonald DW. 2004. *Canids: foxes, wolves, jackals, and dogs: status survey and conservation action plan*: IUCN Gland, Switzerland.

Soderquist T, and Serena M. 1994. Dietary niche of the western quoll, *Dasyurus geoffroii*, in the jarrah forest of Western Australia. *Australian Mammalogy* 17:133-136.

Stenglein JL, Waits LP, Ausband DE, Zager P, and Mack CM. 2011. Estimating gray wolf pack size and family relationships using noninvasive genetic sampling at rendezvous sites. *Journal of Mammalogy* 92:784-795. 10.1644/10-mamm-a-200.1

Tófoli C, Rohe F, and Setz E. 2009. Jaguarundi (*Puma yagouaroundi*) (Geoffroy, 1803) (Carnivora, Felidae) food habits in a mosaic of Atlantic Rainforest and eucalypt plantations of southeastern Brazil. *Brazilian Journal of Biology* 69:871-877. 10.1590/S1519-69842009000400015

Valenzuela AEJ, Raya Rey A, Fasola L, Sáenz Samaniego RA, and Schiavini A. 2013. Trophic ecology of a top predator colonizing the southern extreme of South America: Feeding habits of invasive American mink (*Neovison vison*) in Tierra del Fuego. *Mammalian Biology* 78:104-110. 10.1016/j.mambio.2012.11.007

Varela O, Cormenzana-Méndez A, Krapovickas L, and Bucher EH. 2008. Seasonal diet of the Pampas fox (*Lycalopex gymnocercus*) in the Chaco dry woodland, northwestern Argentina. *Journal of Mammalogy* 89:1012-1019. 10.1644/07-mamm-a-125.1

Walton LR, and Joly DO. 2003. *Canis mesomelas*. *Mammalian Species* 2003:1-9.

Whitehouse SJO. 1977. The diet of the dingo in Western Australia. *Wildlife Research* 4:145-150. 10.1071/WR9770145

Zapata SC, Travaini A, Delibes M, and Martínez-Peck R. 2005. Food habits and resource partitioning between grey and culpeo foxes in southeastern Argentine Patagonia. *Studies on Neotropical Fauna and Environment* 40:97-103. 10.1080/01650520500129836

Zuercher GL, Gipson PS, and Carrillo O. 2005. Diet and habitat associations of bush dogs *Speothos venaticus* in the Interior Atlantic Forest of eastern Paraguay. *Oryx* 39:86-89. 10.1017/S0030605305000153