Table S1. Regressions equations used to estimate life history parameters for extinct species. In all cases, log mass was used as the independent variable. Where possible, equations were calculated at the family level and equations with an $R^2$ value of at least 0.5 were used. If data were insufficient or $R^2$ values were too low, equations at the order or class level with the highest $R^2$ values were used.

<table>
<thead>
<tr>
<th>Order</th>
<th>Family</th>
<th>Life History Trait</th>
<th>Intercept</th>
<th>Slope</th>
<th>$R^2$</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artiodactyla</td>
<td>Antilocapridae</td>
<td>Gestation (mo)</td>
<td>-2.883</td>
<td>2.101</td>
<td>0.71</td>
<td>Class</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Log Newborn mass (g)</td>
<td>-1.140</td>
<td>0.950</td>
<td>0.99</td>
<td>Class</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weaning (mo)</td>
<td>-2.651</td>
<td>2.101</td>
<td>0.33</td>
<td>Class</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Log Weaning mass (g)</td>
<td>-0.311</td>
<td>0.931</td>
<td>0.97</td>
<td>Class</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age at first reproduction</td>
<td>-17.532</td>
<td>12.209</td>
<td>0.46</td>
<td>Class</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum life span (mo)</td>
<td>-115.46</td>
<td>96.186</td>
<td>0.59</td>
<td>Class</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Litter size</td>
<td>4.873</td>
<td>-0.698</td>
<td>0.30</td>
<td>Class</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Litters/year</td>
<td>2.926</td>
<td>-0.414</td>
<td>0.27</td>
<td>Class</td>
</tr>
<tr>
<td>Artiodactyla</td>
<td>Bovidae</td>
<td>Gestation (mo)</td>
<td>-2.641</td>
<td>2.039</td>
<td>0.48</td>
<td>Family</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Log Newborn mass (g)</td>
<td>0.066</td>
<td>0.747</td>
<td>0.86</td>
<td>Family</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weaning (mo)</td>
<td>-7.728</td>
<td>2.660</td>
<td>0.56</td>
<td>Family</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Log Weaning mass (g)</td>
<td>0.001</td>
<td>0.915</td>
<td>0.98</td>
<td>Family</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age at first reproduction</td>
<td>-17.532</td>
<td>12.209</td>
<td>0.46</td>
<td>Class</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum life span (mo)</td>
<td>-210.880</td>
<td>90.978</td>
<td>0.59</td>
<td>Family</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Litter size</td>
<td>4.873</td>
<td>-0.698</td>
<td>0.30</td>
<td>Class</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Litters/year</td>
<td>3.022</td>
<td>-0.396</td>
<td>0.37</td>
<td>Family</td>
</tr>
<tr>
<td>Artiodactyla</td>
<td>Cameliidae</td>
<td>Gestation (mo)</td>
<td>2.288</td>
<td>1.820</td>
<td>0.76</td>
<td>Family</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Log Newborn mass (g)</td>
<td>0.455</td>
<td>0.712</td>
<td>0.97</td>
<td>Family</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Weaning (mo)</td>
<td>-8.471</td>
<td>2.835</td>
<td>0.44</td>
<td>Order</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Log Weaning mass (g)</td>
<td>0.090</td>
<td>0.887</td>
<td>0.89</td>
<td>Order</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age at first reproduction</td>
<td>-100.430</td>
<td>24.898</td>
<td>0.82</td>
<td>Family</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum life span (mo)</td>
<td>-297.080</td>
<td>113.310</td>
<td>0.50</td>
<td>Order</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Litter size</td>
<td>4.873</td>
<td>-0.698</td>
<td>0.30</td>
<td>Class</td>
</tr>
<tr>
<td>Order</td>
<td>Class</td>
<td>Family</td>
<td>Litters/year</td>
<td>Gestation (mo)</td>
<td>Log Newborn mass (g)</td>
<td>Weaning (mo)</td>
</tr>
<tr>
<td>------------------</td>
<td>-------</td>
<td>--------</td>
<td>--------------</td>
<td>----------------</td>
<td>----------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Artiodactyla</td>
<td>Cervidae</td>
<td></td>
<td>2.982</td>
<td>-2.883</td>
<td>-0.894</td>
<td>-8.471</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Artiodactyla</td>
<td>Tayassuidae</td>
<td></td>
<td>2.982</td>
<td>2.883</td>
<td>-0.351</td>
<td>-8.471</td>
</tr>
<tr>
<td>Carnivora</td>
<td>Canidae</td>
<td></td>
<td>2.822</td>
<td>-6.117</td>
<td>-1.010</td>
<td>-2.651</td>
</tr>
<tr>
<td>Carnivora</td>
<td>Felidae</td>
<td></td>
<td>2.822</td>
<td>-6.117</td>
<td>-0.378</td>
<td>-4.568</td>
</tr>
<tr>
<td>Class</td>
<td>Order</td>
<td>Family</td>
<td>Trait</td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>-----------</td>
<td>---------</td>
<td>--------------</td>
<td>-------------------------------</td>
<td>------</td>
<td>-------</td>
<td>----</td>
</tr>
<tr>
<td>Carnivora</td>
<td>Order</td>
<td>Family</td>
<td>Trait</td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maximum life span (mo)</td>
<td>-115.46</td>
<td>96.186</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Litter size</td>
<td>4.873</td>
<td>-0.698</td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Litters/year</td>
<td>2.926</td>
<td>-0.414</td>
<td>0.27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carnivora</td>
<td>Gestation (mo)</td>
<td>-6.117</td>
<td>2.505</td>
<td>0.56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mustelidae</td>
<td>Log Newborn mass (g)</td>
<td>-1.483</td>
<td>0.918</td>
<td>0.82</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Weaning (mo)</td>
<td>-0.838</td>
<td>0.959</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Log Weaning mass (g)</td>
<td>-0.536</td>
<td>1.024</td>
<td>0.92</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Age at first reproduction</td>
<td>-30.633</td>
<td>14.222</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maximum life span (mo)</td>
<td>-115.46</td>
<td>96.186</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Litter size</td>
<td>4.873</td>
<td>-0.698</td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Litters/year</td>
<td>1.525</td>
<td>-0.123</td>
<td>0.06</td>
</tr>
<tr>
<td>Carnivora</td>
<td>Order</td>
<td>Ursidae</td>
<td>Gestation (mo)</td>
<td>-6.117</td>
<td>2.505</td>
<td>0.56</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Log Newborn mass (g)</td>
<td>0.882</td>
<td>0.322</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Weaning (mo)</td>
<td>-16.958</td>
<td>4.744</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Log Weaning mass (g)</td>
<td>0.161</td>
<td>0.795</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Age at first reproduction</td>
<td>-30.633</td>
<td>14.222</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maximum life span (mo)</td>
<td>-375.650</td>
<td>162.710</td>
<td>0.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Litter size</td>
<td>4.873</td>
<td>-0.698</td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Litters/year</td>
<td>2.306</td>
<td>-0.356</td>
<td>0.83</td>
</tr>
<tr>
<td>Lagomorpha</td>
<td>Order</td>
<td>Family</td>
<td>Gestation (mo)</td>
<td>-0.952</td>
<td>0.683</td>
<td>0.64</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Log Newborn mass (g)</td>
<td>Pantheria</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Weaning (mo)</td>
<td>-1.786</td>
<td>0.870</td>
<td>0.31</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Log Weaning mass (g)</td>
<td>Pantheria</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Age at first reproduction</td>
<td>-1.947</td>
<td>1.390</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maximum life span (mo)</td>
<td>Pantheria</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Litter size</td>
<td>Pantheria</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Litters/year</td>
<td>Pantheria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perissodactyla</td>
<td>Order</td>
<td>Family</td>
<td>Gestation (mo)</td>
<td>-2.883</td>
<td>2.101</td>
<td>0.708</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Equidae</td>
<td>Log Newborn mass (g)</td>
<td>0.382</td>
<td>0.693</td>
<td>0.47</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Weaning (mo)</td>
<td>Perissodactyla</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maximum life span (mo)</td>
<td>Perissodactyla</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Log Weaning mass (g)</td>
<td>Age at first reproduction</td>
<td>Maximum life span (mo)</td>
<td>Litter size</td>
<td>Litters/year</td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>----------------------</td>
<td>----------------------------</td>
<td>------------------------</td>
<td>-------------</td>
<td>--------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.311</td>
<td>-584.200</td>
<td>-115.46</td>
<td>4.873</td>
<td>4.454</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.931</td>
<td>113.340</td>
<td>96.186</td>
<td>-0.698</td>
<td>-0.710</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.97</td>
<td>0.85</td>
<td>0.59</td>
<td>0.30</td>
<td>0.57</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Class</td>
<td>Family</td>
<td>Class</td>
<td>Class</td>
<td>Family</td>
<td></td>
</tr>
<tr>
<td>Proboscidea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elephantidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Log Newborn mass (g)</td>
<td>-2.883</td>
<td>1.140</td>
<td>2.926</td>
<td>2.926</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-1.140</td>
<td>-0.950</td>
<td>0.950</td>
<td>-0.414</td>
<td>-0.414</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.99</td>
<td>0.33</td>
<td>0.33</td>
<td>0.27</td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
<td></td>
</tr>
<tr>
<td>Proboscidea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mammutidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Log Newborn mass (g)</td>
<td>-2.883</td>
<td>1.140</td>
<td>2.926</td>
<td>2.926</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-1.140</td>
<td>-0.950</td>
<td>0.950</td>
<td>-0.414</td>
<td>-0.414</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.99</td>
<td>0.33</td>
<td>0.33</td>
<td>0.27</td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
<td></td>
</tr>
<tr>
<td>Rodentia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Castoridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Log Newborn mass (g)</td>
<td>-2.883</td>
<td>1.140</td>
<td>2.926</td>
<td>2.926</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-1.140</td>
<td>-0.950</td>
<td>0.950</td>
<td>-0.414</td>
<td>-0.414</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.99</td>
<td>0.33</td>
<td>0.33</td>
<td>0.27</td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
<td></td>
</tr>
<tr>
<td>Rodentia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muridae</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Log Newborn mass (g)</td>
<td>-2.883</td>
<td>1.140</td>
<td>2.926</td>
<td>2.926</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-1.140</td>
<td>-0.950</td>
<td>0.950</td>
<td>-0.414</td>
<td>-0.414</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.99</td>
<td>0.33</td>
<td>0.33</td>
<td>0.27</td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
<td>Class</td>
<td></td>
</tr>
<tr>
<td>Animal Group</td>
<td>Family</td>
<td>Gestation (mo)</td>
<td>Log Newborn mass (g)</td>
<td>Weaning (mo)</td>
<td>Log Weaning mass (g)</td>
<td>Age at first reproduction</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------</td>
<td>----------------</td>
<td>----------------------</td>
<td>--------------</td>
<td>----------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>Pilosa</td>
<td>Dasypodidae</td>
<td>-2.883</td>
<td>-1.140</td>
<td>0.098</td>
<td>-0.311</td>
<td>-17.532</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.101</td>
<td>0.950</td>
<td>0.493</td>
<td>0.931</td>
<td>12.209</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.71</td>
<td>0.99</td>
<td>0.36</td>
<td>0.97</td>
<td>0.46</td>
</tr>
<tr>
<td>Cingulata</td>
<td>Megalonychidae</td>
<td>-2.883</td>
<td>-1.140</td>
<td>2.101</td>
<td>-0.311</td>
<td>-17.532</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.101</td>
<td>0.950</td>
<td>0.33</td>
<td>0.931</td>
<td>12.209</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.71</td>
<td>0.99</td>
<td>0.36</td>
<td>0.97</td>
<td>0.46</td>
</tr>
<tr>
<td>Cingulata</td>
<td>Megatheriidae</td>
<td>-2.883</td>
<td>-1.140</td>
<td>2.101</td>
<td>-0.311</td>
<td>-17.532</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.101</td>
<td>0.950</td>
<td>0.33</td>
<td>0.931</td>
<td>12.209</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.71</td>
<td>0.99</td>
<td>0.36</td>
<td>0.97</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>Class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Litters/year</td>
<td></td>
<td>2.926</td>
<td>-0.414</td>
<td>0.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cingulata</td>
<td>Mylodontidae</td>
<td>Gestation (mo)</td>
<td>-2.883</td>
<td>2.101</td>
<td>0.71</td>
<td></td>
</tr>
<tr>
<td>Log Newborn mass (g)</td>
<td></td>
<td>-1.140</td>
<td>0.950</td>
<td>0.99</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weaning (mo)</td>
<td></td>
<td>-2.651</td>
<td>2.101</td>
<td>0.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log Weaning mass (g)</td>
<td></td>
<td>-0.311</td>
<td>0.931</td>
<td>0.97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age at first reproduction</td>
<td></td>
<td>-17.532</td>
<td>12.209</td>
<td>0.46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum life span (mo)</td>
<td></td>
<td>-115.46</td>
<td>96.186</td>
<td>0.59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Litter size</td>
<td></td>
<td>4.873</td>
<td>-0.698</td>
<td>0.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Litters/year</td>
<td></td>
<td>2.926</td>
<td>-0.414</td>
<td>0.27</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>