**Supplementary Data: C.E. Cooper and P.C. Withers Thermoregulatory role of insensible evaporative water loss constancy in a heterothermic marsupial.**

**Supplementary Data Table 1**: Physiological variables (body temperature, Tb; metabolic rate, MR; evaporative water loss, EWL; wet and dry thermal conductance, Cwet and Cdry; EWL/ water vapour pressure deficit calculated from Tb; EWL/ water vapour pressure deficit calculated from Ta) measured for normothermic red-tailed phascogales (*Phascogale calura*) at a range of ambient temperatures (Ta) and relative humidities (RH).

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Animal | Ta  (oC) | RH (%) | Mass (g) | Tb (oC) | MR  (ml O2 g-1 h-1) | EWL  (mg g-1 h-1) | Cwet (J g-1 h-1 oC-1) | Cdry (J g-1 h-1 oC-1) | EWL/∆WVPTb | EWL/∆WVPTa |
| RTP1 | 20 | 17 | 30.8 | 36.4 | 2.493 | 1.713 | 2.99 | 2.75 | 40.2 | 119.4 |
| RTP2 | 20 | 17 | 32.9 | 35.5 | 2.141 | 2.410 | 2.73 | 2.36 | 62.4 | 192.1 |
| RTP3 | 20 | 17 | 24.5 | 32.6 | 3.616 | 1.753 | 5.68 | 5.36 | 50.6 | 119.6 |
| RTP4 | 20 | 17 | 33.4 | 37.3 | 2.257 | 1.801 | 2.58 | 2.34 | 40.7 | 131.3 |
| RTP5 | 20 | 17 | 26.2 | 33.2 | 2.516 | 1.520 | 3.70 | 3.43 | 42.7 | 104.4 |
| RTP6 | 20 | 17 | 35.5 | 34.2 | 2.750 | 1.675 | 3.67 | 3.40 | 46.8 | 136.3 |
| RTP7 | 20 | 17 | 36.9 | 31.5 | 2.068 | 1.609 | 3.37 | 3.06 | 53.5 | 135.7 |
| RTP4 | 20 | 36 | 43.7 | 33.4 | 2.120 | 1.335 | 3.45 | 3.19 | 43.2 | 119.3 |
| RTP5 | 20 | 36 | 30.4 | 35.3 | 2.699 | 1.663 | 4.02 | 3.72 | 48.0 | 144.7 |
| RTP6 | 20 | 36 | 35.9 | 33.1 | 2.258 | 1.399 | 3.74 | 3.46 | 45.6 | 123.4 |
| RTP7 | 20 | 36 | 39.2 | 34.4 | 2.462 | 1.318 | 3.78 | 3.54 | 39.4 | 114.8 |
| RTP8 | 20 | 36 | 36.6 | 35.8 | 2.425 | 1.464 | 3.46 | 3.20 | 41.1 | 130.0 |
| RTP9 | 20 | 36 | 28.0 | 32.6 | 2.485 | 1.014 | 4.16 | 3.95 | 33.2 | 82.8 |
| RTP10 | 20 | 36 | 28.7 | 34.4 | 2.159 | 1.088 | 3.34 | 3.13 | 32.2 | 86.9 |
| RTP4 | 20 | 48 | 37.0 | 33.5 | 2.438 | 1.454 | 3.51 | 3.26 | 49.3 | 179.1 |
| RTP6 | 20 | 48 | 33.0 | 33.8 | 2.252 | 1.846 | 3.25 | 2.93 | 61.7 | 232.7 |
| RTP7 | 20 | 48 | 35.5 | 33.2 | 2.435 | 1.241 | 3.87 | 3.63 | 43.3 | 139.7 |
| RTP8 | 20 | 48 | 34.4 | 32.0 | 2.438 | 2.307 | 4.24 | 3.75 | 94.5 | 328.3 |
| RTP9 | 20 | 48 | 28.8 | 30.9 | 2.042 | 1.834 | 3.76 | 3.36 | 75.5 | 218.8 |
| RTP10 | 20 | 48 | 27.6 | 33.5 | 2.380 | 1.224 | 3.74 | 3.51 | 41.2 | 131.8 |
| RTP1 | 20 | 63 | 30.8 | 36.5 | 2.153 | 2.465 | 2.68 | 2.32 | 75.3 | 545.8 |
| RTP2 | 20 | 63 | 37.4 | 34.8 | 2.190 | 1.696 | 3.06 | 2.76 | 59.9 | 336.1 |
| RTP3 | 20 | 63 | 28.6 | 33.7 | 2.409 | 1.278 | 3.50 | 3.27 | 45.6 | 199.4 |
| RTP4 | 20 | 63 | 36.1 | 34.2 | 2.678 | 1.449 | 3.89 | 3.63 | 52.4 | 255.2 |
| RTP5 | 20 | 63 | 31.3 | 33.6 | 2.126 | 1.105 | 3.02 | 2.82 | 39.7 | 182.6 |
| RPT8 | 20 | 63 | 36.4 | 37.5 | 2.681 | 1.260 | 3.22 | 3.03 | 34.4 | 177.2 |
| RTP9 | 20 | 63 | 29.7 | 33.5 | 2.377 | 1.058 | 3.20 | 3.02 | 39.9 | 251.2 |
| RTP1 | 20 | 81 | 26.4 | 31.0 | 2.309 | 1.337 | 4.20 | 3.91 | 65.5 | 325.5 |
| RTP2 | 20 | 81 | 32.2 | 33.1 | 2.467 | 1.471 | 3.95 | 3.67 | 63.2 | 411.1 |
| RTP3 | 20 | 81 | 30.7 | 35.0 | 3.302 | 2.109 | 4.36 | 4.02 | 76.7 | 730.5 |
| RTP4 | 20 | 81 | 37.9 | 36.3 | 2.716 | 1.379 | 3.38 | 3.17 | 45.3 | 410.6 |
| RTP5 | 20 | 81 | 27.4 | 31.5 | 2.582 | 1.337 | 4.45 | 4.17 | 63.0 | 337.7 |
| RTP6 | 20 | 81 | 31.1 | 32.5 | 2.442 | 1.274 | 3.87 | 3.62 | 55.1 | 327.8 |
| RTP7 | 20 | 81 | 33.6 | 31.6 | 2.029 | 1.173 | 3.66 | 3.40 | 57.3 | 300.6 |
| RTP8 | 20 | 81 | 35.2 | 33.5 | 2.660 | 2.025 | 4.15 | 3.77 | 87.5 | 782.7 |
| RTP10 | 20 | 81 | 28.7 | 32.4 | 3.046 | 1.203 | 5.05 | 4.80 | 53.9 | 295.8 |
| RTP4 | 25 | 17 | 46.8 | 34.7 | 1.610 | 1.253 | 3.23 | 2.92 | 34.3 | 66.9 |
| RTP6 | 25 | 17 | 33.7 | 32.4 | 1.670 | 0.955 | 4.51 | 4.19 | 29.3 | 47.5 |
| RTP7 | 25 | 17 | 37.4 | 32.9 | 1.335 | 1.464 | 3.82 | 3.33 | 41.8 | 65.4 |
| RTP8 | 25 | 17 | 30.3 | 34.2 | 1.950 | 1.912 | 5.26 | 4.64 | 52.3 | 84.5 |
| RTP9 | 25 | 17 | 28.4 | 32.2 | 1.521 | 1.076 | 4.12 | 3.76 | 33.1 | 53.3 |
| RTP10 | 25 | 17 | 28.7 | 31.1 | 1.294 | 1.250 | 6.19 | 5.49 | 52.8 | 76.9 |
| RTP4 | 25 | 36 | 47.2 | 32.8 | 1.752 | 0.990 | 4.53 | 4.22 | 37.2 | 73.5 |
| RTP6 | 25 | 36 | 34.7 | 33.5 | 1.527 | 1.041 | 3.64 | 3.35 | 33.6 | 64.4 |
| RTP7 | 25 | 36 | 38.4 | 34.0 | 1.338 | 1.111 | 3.27 | 2.95 | 35.0 | 66.6 |
| RTP8 | 25 | 36 | 31.3 | 32.7 | 1.498 | 1.168 | 4.02 | 3.63 | 43.6 | 84.0 |
| RTP9 | 25 | 36 | 31.9 | 34.3 | 1.256 | 1.126 | 3.49 | 3.13 | 35.9 | 65.3 |
| RTP10 | 25 | 36 | 29.8 | 33.9 | 1.740 | 1.181 | 4.55 | 4.18 | 38.5 | 71.2 |
| RTP4 | 25 | 48 | 41.6 | 34.3 | 1.204 | 1.107 | 2.85 | 2.55 | 37.1 | 82.6 |
| RTP5 | 25 | 48 | 31.8 | 37.1 | 1.866 | 1.627 | 3.13 | 2.81 | 44.9 | 129.3 |
| RTP6 | 25 | 48 | 32.7 | 34.7 | 1.296 | 1.501 | 2.82 | 2.43 | 49.1 | 112.7 |
| RTP7 | 25 | 48 | 38.3 | 34.3 | 1.292 | 1.681 | 3.13 | 2.63 | 60.7 | 133.8 |
| RTP8 | 25 | 48 | 36.3 | 37.5 | 1.982 | 1.338 | 3.23 | 2.97 | 35.7 | 101.4 |
| RTP9 | 25 | 48 | 28.7 | 34.4 | 1.291 | 1.441 | 2.71 | 2.34 | 47.6 | 108.6 |
| RTP10 | 25 | 48 | 29.3 | 33.6 | 1.862 | 1.565 | 4.91 | 4.41 | 57.8 | 116.5 |
| RTP4 | 25 | 63 | 43.6 | 33.4 | 1.405 | 0.910 | 3.46 | 3.19 | 38.4 | 100.1 |
| RTP5 | 25 | 63 | 26.2 | 31.6 | 1.312 | 1.113 | 4.00 | 3.59 | 54.4 | 118.2 |
| RTP6 | 25 | 63 | 36.8 | 33.0 | 1.686 | 0.928 | 4.81 | 4.49 | 42.4 | 98.8 |
| RTP7 | 25 | 63 | 38.3 | 33.1 | 1.795 | 1.127 | 4.50 | 4.16 | 49.6 | 130.0 |
| RTP8 | 25 | 63 | 35.2 | 32.8 | 1.291 | 0.861 | 3.86 | 3.55 | 39.8 | 88.4 |
| RTP9 | 25 | 63 | 28.9 | 34.5 | 1.272 | 1.077 | 2.81 | 2.53 | 40.8 | 116.3 |
| RTP10 | 25 | 63 | 29.6 | 33.6 | 1.741 | 0.854 | 4.79 | 4.51 | 36.7 | 86.7 |
| RTP4 | 25 | 81 | 44.8 | 33.2 | 1.475 | 0.591 | 3.59 | 3.41 | 32.4 | 145.4 |
| RTP6 | 25 | 81 | 37.3 | 34.0 | 1.555 | 0.628 | 3.45 | 3.29 | 31.2 | 164.6 |
| RTP7 | 25 | 81 | 38.9 | 33.0 | 1.569 | 0.635 | 3.76 | 3.58 | 35.4 | 176.3 |
| RTP8 | 25 | 81 | 34.4 | 32.3 | 1.981 | 0.678 | 5.48 | 5.25 | 41.5 | 161.8 |
| RTP9 | 25 | 81 | 28.8 | 32.3 | 1.558 | 0.604 | 4.31 | 4.11 | 35.9 | 132.4 |
| RTP10 | 25 | 81 | 29.7 | 31.6 | 1.419 | 0.461 | 4.22 | 4.05 | 29.7 | 103.0 |
| RTP1 | 30 | 17 | 29.3 | 33.2 | 0.915 | 1.832 | 4.31 | 3.27 | 51.1 | 66.2 |
| RTP2 | 30 | 17 | 30.5 | 34.0 | 1.102 | 1.486 | 4.39 | 3.68 | 40.7 | 55.9 |
| RTP3 | 30 | 17 | 28.3 | 34.2 | 1.034 | 1.265 | 3.56 | 3.03 | 33.1 | 46.6 |
| RTP4 | 30 | 17 | 23.2 | 34.0 | 1.157 | 1.279 | 4.46 | 3.87 | 34.3 | 47.2 |
| RTP5 | 30 | 17 | 24.7 | 33.1 | 1.013 | 1.346 | 7.10 | 5.95 | 40.7 | 49.0 |
| RTP7 | 30 | 17 | 36.6 | 34.2 | 1.135 | 1.278 | 5.64 | 4.86 | 36.7 | 47.6 |
| RTP10 | 30 | 17 | 28.6 | 32.7 | 0.948 | 1.391 | 7.76 | 6.38 | 43.8 | 51.6 |
| RTP1 | 30 | 36 | 31.2 | 33.8 | 0.956 | 1.064 | 3.90 | 3.39 | 33.9 | 49.6 |
| RTP2 | 30 | 36 | 34.0 | 36.0 | 1.032 | 1.949 | 3.24 | 2.54 | 64.4 | 119.8 |
| RTP3 | 30 | 36 | 23.9 | 33.1 | 0.873 | 1.536 | 4.29 | 3.44 | 51.6 | 71.8 |
| RTP4 | 30 | 36 | 35.3 | 36.4 | 1.208 | 2.143 | 3.37 | 2.66 | 62.6 | 112.8 |
| RTP5 | 30 | 36 | 26.1 | 33.1 | 0.877 | 1.175 | 4.60 | 3.88 | 41.0 | 55.8 |
| RTP9 | 30 | 36 | 28.3 | 33.5 | 0.957 | 1.244 | 4.66 | 3.94 | 40.9 | 56.1 |
| RTP10 | 30 | 36 | 28.7 | 33.7 | 0.913 | 1.106 | 5.86 | 5.01 | 37.9 | 48.5 |
| RTP1 | 30 | 48 | 29.9 | 33.2 | 0.833 | 1.152 | 4.40 | 3.69 | 43.0 | 59.9 |
| RTP2 | 30 | 48 | 31.8 | 38.8 | 0.978 | 2.229 | 2.20 | 1.64 | 59.3 | 137.3 |
| RTP3 | 30 | 48 | 23.9 | 33.9 | 1.043 | 1.350 | 4.76 | 4.07 | 47.6 | 70.8 |
| RTP4 | 30 | 48 | 29.9 | 34.3 | 1.028 | 1.317 | 4.32 | 3.70 | 49.1 | 79.2 |
| RTP5 | 30 | 48 | 25.1 | 33.0 | 1.093 | 1.436 | 5.90 | 4.99 | 57.6 | 81.4 |
| RTP8 | 30 | 48 | 36.0 | 31.9 | 0.733 | 0.980 | 8.75 | 7.35 | 48.6 | 58.0 |
| RTP9 | 30 | 48 | 27.5 | 33.9 | 0.945 | 1.353 | 5.08 | 4.23 | 55.3 | 80.7 |
| RTP1 | 30 | 63 | 34.3 | 33.5 | 0.972 | 0.802 | 4.63 | 4.17 | 38.6 | 63.9 |
| RTP2 | 30 | 63 | 35.0 | 33.9 | 0.998 | 1.422 | 4.13 | 3.44 | 65.2 | 116.7 |
| RTP3 | 30 | 63 | 24.0 | 34.9 | 1.096 | 1.314 | 3.54 | 3.03 | 53.2 | 107.6 |
| RTP4 | 30 | 63 | 33.3 | 35.2 | 1.559 | 2.307 | 5.47 | 4.52 | 103.2 | 220.7 |
| RTP5 | 30 | 63 | 24.9 | 33.5 | 0.881 | 1.262 | 4.36 | 3.66 | 42.2 | 58.9 |
| RTP6 | 30 | 63 | 33.8 | 32.4 | 1.017 | 1.278 | 10.8 | 9.13 | 93.7 | 127.5 |
| RTP8 | 30 | 63 | 38.9 | 32.7 | 0.659 | 0.746 | 6.23 | 5.41 | 51.1 | 72.9 |
| RTP3 | 30 | 81 | 25.7 | 34.8 | 1.931 | 2.032 | 8.32 | 7.26 | 140.4 | 413.5 |
| RTP5 | 30 | 81 | 26.8 | 34.5 | 1.167 | 0.740 | 5.37 | 4.95 | 47.5 | 108.3 |
| RTP6 | 30 | 81 | 31.6 | 34.6 | 0.918 | 0.766 | 4.21 | 3.80 | 52.5 | 139.6 |
| RTP8 | 30 | 81 | 35.0 | 32.7 | 0.935 | 0.659 | 7.48 | 6.84 | 57.7 | 99.9 |
| RTP9 | 30 | 81 | 28.2 | 34.9 | 1.110 | 0.982 | 4.78 | 4.27 | 63.5 | 169.0 |
| RTP10 | 30 | 81 | 28.3 | 34.2 | 1.133 | 0.791 | 5.63 | 5.15 | 57.2 | 138.7 |

**Supplementary Data Table 2:** Physiological variables (metabolic rate, MR; evaporative water loss, EWL; EWL/water vapour pressure deficit calculated from Tb, EWL/∆WVPTb; EWL/water vapour pressure deficit calculated from Ta, EWL/∆WVPTa) measured for torpid red-tailed phascogales (*Phascogale calura*) at a range of ambient temperatures (Ta) and relative humidities (RH).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Animal | Ta  (oC) | RH (%) | MR  (ml O2 g-1 h-1) | EWL  (mg g-1 h-1) | EWL/∆WVPTb | EWL/∆WVPTa |
| RTP1 | 20 | 17 | 0.282 | 0.895 | 52.3 | 55.8 |
| RTP3 | 20 | 17 | 0.965 | 1.270 | 61.8 | 83.0 |
| RTP7 | 20 | 17 | 1.176 | 1.007 | 51.0 | 78.4 |
| RTP5 | 20 | 36 | 0.297 | 0.519 | 35.4 | 39.7 |
| RTP8 | 20 | 36 | 0.254 | 0.411 | 28.6 | 31.6 |
| RTP9 | 20 | 36 | 0.329 | 0.501 | 34.4 | 39.0 |
| RTP5 | 20 | 48 | 1.678 | 2.434 | 133.9 | 314.9 |
| RTP7 | 20 | 48 | 0.835 | 0.946 | 66.3 | 101.1 |
| RTP8 | 20 | 48 | 0.937 | 0.567 | 36.0 | 58.2 |
| RTP9 | 20 | 48 | 0.292 | 0.775 | 71.7 | 80.7 |
| RTP1 | 20 | 63 | 0.727 | 0.670 | 60.0 | 96.0 |
| RTP5 | 20 | 63 | 0.461 | 0.468 | 49.4 | 67.0 |
| RPT8 | 20 | 63 | 0.402 | 0.454 | 42.1 | 53.5 |
| RTP9 | 20 | 63 | 0.196 | 0.278 | 43.4 | 50.8 |
| RTP1 | 20 | 81 | 0.618 | 0.446 | 51.1 | 86.6 |
| RTP5 | 20 | 81 | 1.085 | 0.637 | 54.6 | 131.8 |
| RTP7 | 20 | 81 | 1.050 | 0.837 | 76.0 | 191.8 |
| RTP8 | 20 | 81 | 0.547 | 0.262 | 30.2 | 49.4 |
| RTP9 | 20 | 81 | 0.326 | 0.391 | 58.2 | 77.8 |
| RTP10 | 20 | 81 | 0.324 | 0.357 | 51.3 | 68.9 |
| RTP4 | 25 | 17 | 0.634 | 0.826 | 33.8 | 41.3 |
| RTP6 | 25 | 17 | 1.095 | 0.943 | 32.8 | 47.0 |
| RTP7 | 25 | 17 | 0.933 | 1.400 | 48.0 | 62.6 |
| RTP9 | 25 | 17 | 0.850 | 0.746 | 27.8 | 36.6 |
| RTP10 | 25 | 17 | 0.690 | 0.770 | 34.9 | 46.2 |
| RTP10 | 25 | 36 | 0.669 | 1.055 | 49.1 | 63.2 |
| RTP8 | 25 | 48 | 0.448 | 0.703 | 40.7 | 49.3 |
| RTP9 | 25 | 48 | 0.655 | 1.181 | 65.4 | 85.7 |
| RTP4 | 25 | 63 | 0.840 | 0.834 | 53.3 | 90.0 |
| RTP5 | 25 | 63 | 0.554 | 0.267 | 29.0 | 54.6 |
| RTP7 | 25 | 63 | 0.642 | 0.525 | 36.1 | 54.1 |
| RTP8 | 25 | 63 | 0.485 | 0.408 | 28.8 | 39.2 |
| RTP9 | 25 | 63 | 0.814 | 0.758 | 48.3 | 79.4 |
| RTP10 | 25 | 63 | 0.939 | 0.384 | 20.6 | 37.1 |
| RTP7 | 25 | 81 | 0.392 | 0.177 | 24.0 | 40.0 |
| RTP8 | 25 | 81 | 0.761 | 0.330 | 32.1 | 78.0 |