Appendix IIIb. *Allometric relations for metabolic rates* (R) *and standard metabolic rates* (R_s) *of poikilotherms and unicells*

Taxon	Independent variable	Conditions	Range of W (kg)	N	No. of spp.	Reference	Standardized relation: Intercept at W=1 kg, a (Watts)	Slope $b \pm S_b$	r^2	S_{xy}
Poikilotherms	R_s	T_b=20°C	1×10^{-6}–100	33		Hemmingsen (1960)	0.14	0.751±0.015		
Poikilotherms	R_s	T_b=20°C	1×10^{-3}–30			Robinson et al. (1983)	0.20	0.76		
Poikilotherms	R_s	exp(0.051±0.0033) T_b	1×10^{-3}–30	729		Robinson et al. (1983)	0.071	0.76±0.0084	0.59	
Reptiles	R	T_b=18°C	0.01–100	11		Kayser & Heusner (1964)	0.086	0.728±0.034		
Reptiles	R_s	T_b=20°C	0.001–100	73		Bennett & Dawson (1976)	0.14	0.80±0.0075		
Reptiles	R_s	T_b=30°C	0.001–100	44		Bennett & Dawson (1976)	0.32	0.77±0.0075	0.69	
Reptiles	R					Zotin & Konoplev (1978)	0.41	0.74±0.015	0.83	
Reptiles	R					Zotin & Konoplev (1978)	0.94	0.77		
Lizards	R_s	T_b=20°C	0.001–1	13		Bennett & Dawson (1976)	0.13	0.80±0.018	0.64	
Lizards	R_s	T_b=30°C	0.001–7	24		Bennett & Dawson (1976)	0.41	0.83±0.010	0.73	
Lizards	R_s	T_b=30°C				Bartholomew & Tucker (1964)	0.378	0.821±0.018		
Lizards	R_s	T_b=37°C	0.001–1	24		Bennett & Dawson (1976)	0.68	0.82±0.018	0.67	

Appendix IIIb. (*cont.*)

Taxon	Independent variable	Conditions	Range of W (kg)	N	No. of spp.	Reference	Standardized relation: Intercept at W=1 kg, a (Watts)	Slope $b \pm S_b$	r^2	S_{xy}
Xanthusids	R_s	T_b=25°C			10	Mautz (1979)	0.24	0.79±0.033		
Xanthusids	R_s	T_b=35°C			10	Mautz (1979)	0.83	0.88±0.03		
Varanids	R_s	T_b=30°C	0.016–4.4		10	Bartholomew & Tucker (1964)	0.333	0.62±0.024		
Snakes	R_s	T_b=20°C	0.007–20	35		Bennett & Dawson (1976)	0.137	0.77±0.03	0.64	
Snakes	R_s	T_b=30°C	0.007–20	13		Bennett & Dawson (1976)	0.202	0.71±0.035	0.83	
Snakes	R_s		0.350–22.5	83	15	Dmi'el (1972)	0.455	0.60±0.036	0.72	
Turtles	R_s	T_b=20°C		10		Bennett & Dawson (1976)	0.137	0.86±0.025		
Turtles	R_s		0.003–0.86	24		Kayser & Heusner (1964)	0.212	0.86±0.032		
Amphibians	R_s					Zotin & Konoplev (1978)	0.296	0.77		
Temperate salamanders	R_s	T_b=5°C		43	6	Feder (1976)	0.00724	0.622±0.014	0.929	
Tropical salamanders	R_s	T_b=5°C		26	4	Feder (1976)	0.025	0.837±0.026	0.920	
Temperate salamanders	R_s	T_b=15°C		83	12	Feder (1976)	0.059	0.823±0.012	0.935	
Tropical salamanders	R_s	T_b=15°C		81	13	Feder (1976)	0.046	0.860±0.018	0.884	
Lungless salamanders	R_s	T_b=15°C		37		Whitford & Hutchinson (1967)	0.0968	0.72		
Lunged salamanders	R_s	T_b=15°C		66		Whitford & Hutchinson (1967)	0.227	0.856		

Temperate salamanders	R_s	T_b=25°C	0.0005–0.030	56	9	Feder (1976)	0.135	0.802±0.0095	0.970
Tropical salamanders	R_s	T_b=25°C	0.0005–0.030	26	5	Feder (1976)	0.123	0.813±0.030	0.891
Frogs	R	T_b=5°C				Hutchinson et al. (1968)	0.0142	0.71	
Frogs	R	T_b=15°C				Hutchinson et al. (1968)	0.139	0.71	
Frogs	R	T_b=25°C				Hutchinson et al. (1968)	0.394	0.71	
Fishes	R_s	T_a=20°C	2×10^{-5}–10	369		Winberg (1960)	0.386	0.78±0.096	
Fishes	R_s	T_a=20°C	2×10^{-5}–10	364		Winberg (1960)	0.428	0.81±0.0105	
Teleosts	R	T_a=25°C	0.01–0.05	119		Kayser & Heusner (1964)	0.141	0.70±0.01	
Teleosts	R					Zotin & Konoplev (1978)	0.447	0.81	
Teleosts	R					Zotin & Konoplev (1978)	0.273	0.77	
Freshwater fishes	R_s		2×10^{-5}–10	266		Winberg (1960)	0.446	0.81±0.014	
Marine fishes	R_s			123		Winberg (1960)	0.420	0.79±0.014	
Salmonids	R_s	T_a=20°C	1×10^{-4}–1	31		Winberg (1960)	0.53	0.76±0.032	0.95
Salmon	R_s	T_a=15°C	0.003–1.5		1	Brett (1965)	0.163	0.775	
Cyprinids	R_s	T_a=20°C	1×10^{-3}–1	43		Winberg (1960)	0.47	0.80±0.044	
Cyprinodonts	R_s	T_a=20°C	1×10^{-5}–2	23		Winberg (1960)	0.14	0.71±0.042	
Sturgeons	R_s	T_a=20°C	2×10^{-5}–10	33		Winberg (1960)	0.47	0.80	0.99
Cyclostomes	R					Zotin & Konoplev (1978)	0.494	0.81	
Amphioxi	R					Zotin & Konoplev (1978)	0.854	0.91	
Insects	R					Zotin & Konoplev (1978)	0.600	0.76	
Insects	R			47		Kayser & Heusner (1964)	0.283	0.62±0.08	

I. Units and useful conversions

Appendix Ia. *Approximate conversions (the equivalents listed here are not exact; they are determined empirically)*

1 kg dry mass	= 3–10 kg wet mass
1 kg dry mass	$= 22 \times 10^6$ J
1 kg wet mass	$= 7 \times 10^6$ J
1 kg fat	$= 40 \times 10^6$ J
Tissue density	= 1 kg liter^{-1}
1 kg wet mass	$= 1 \times 10^{15}\ \mu m^3$
1 kg dry mass	= 0.4 kg carbon
1 ml O_2	= 20.1 J

Appendix Ib. *Exact conversions (the equivalents listed here are determined by definition)*

Acceleration

$1\ m\ s^{-2} = 0.102$ G

$9.8\ m\ s^{-2} = 1$ G

Force (mass × acceleration)

1 Newton $= 1\ kg\ m\ s^{-2}$
$= 0.102$ kg force
$= 1 \times 10^5$ dynes

Work and energy (force × distance)

1 Joule $= 1\ kg\ m^2\ s^{-2}$
$= 1$ N m
$= 0.239$ cal
$= 1 \times 10^7$ ergs

Power (energy per unit time)

1 Watt $= 1\ kg\ m^2\ s^{-3}$
$= 1\ J\ s^{-1}$

1 ml $O_2\ s^{-1} = 0.0446$ mMol $O_2\ s^{-1}$
$= 1.43$ mg $O_2\ s^{-1}$

Pressure (force per unit area)

1 Pascal $= 1\ kg\ m^{-1}\ s^{-2}$
$= 1\ N\ m^{-2}$
$= 9.87 \times 10^{-6}$ atm
$= 1.0 \times 10^{-5}$ bar
$= 7.501$ torr
$= 7.501$ mm Hg
$= 0.102$ mm H_20

Volume

$1\ m^3 = 1 \times 10^3$ liters
$= 1 \times 10^6\ cm^3$
$= 1 \times 10^{18}\ \mu m^3$

Mass

$1\ kg = 1 \times 10^{-3}$ ton

Note: A bewildering variety of units have been used in allometric relations. To facilitate comparisons, all relations in Appendixes II–X have been standardized by expressing *W* in kilograms of fresh mass and by expressing *Y* in comparable units when possible. This standardization involves a number of conversions.