



Fig. S1. Evaporative cooling capacity (EHL/MHP) as a function of air temperature in Lesser Goldfinch, House Finch, Pyrrhuloxia, Cactus Wren, Northern Cardinal, Abert's Towhee, and Curve-billed Thrasher. EHL/MHP was regressed against T_{air} above 36°C (all $P < 0.001$). The solid circles represent more active birds (activity score = 2) and are included in all regressions and parameter estimates. See text for statistical details of linear regressions and Table S3 for parameter estimates.

Table S1. Slope (m) and intercept (b) for the relationship of mass independent residuals of resting metabolic rate (RMRr) and evaporative water loss rate (EWLr) in response to air temperature above the upper critical temperature (T_{uc} , determined from RMRr) in 7 species of Sonoran Desert passerine birds.

Species	T_{uc} (°C)	regression	m	b
Lesser Goldfinch	36.17 (33.98 38.36)	RMRr ($> T_{uc}$)	0.009 (0.005 0.013)	-0.39 (-0.56 -0.22)
House Finch	39.33 (35.06 43.61)	RMRr ($> T_{uc}$)	0.015 (0.011 0.019)	-0.63 (-0.82 -0.45)
Pyrrhuloxia	39.73 (17.48 61.97)	RMRr ($> T_{uc}$)	0.024 (0.010 0.039)	-1.04 (-1.70 -0.38)
Cactus Wren	37.00 (35.03 38.97)	RMRr ($> T_{uc}$)	0.016 (0.011 0.021)	-0.76 (-0.96 -0.55)
Northern Cardinal	37.03 (33.75 40.31)	RMRr ($> T_{uc}$)	0.038 (0.027 0.049)	-1.57 (-2.06 -1.08)
Abert's Towhee	36.73 (34.22 39.24)	RMRr ($> T_{uc}$)	0.018 (0.008 0.029)	-0.73 (-1.19 -0.27)
Curve-billed Thrasher	42.61 (40.22 45.00)	RMRr ($> T_{uc}$)	0.071 (0.034 0.107)	-3.17 (-4.84 -1.49)
Lesser Goldfinch	36.17 (33.98 38.36)	EWLr ($> T_{uc}$)	0.051 (0.044 0.058)	-2.09 (-2.41 -1.78)
House Finch	39.33 (35.06 43.61)	EWLr ($> T_{uc}$)	0.100 (0.090 0.110)	-4.22 (-4.63 -3.80)
Pyrrhuloxia	39.73 (17.48 61.97)	EWLr ($> T_{uc}$)	0.130 (0.112 0.149)	-5.45 (-6.28 -4.63)
Cactus Wren	37.00 (35.03 38.97)	EWLr ($> T_{uc}$)	0.137 (0.119 0.155)	-5.85 (-6.65 -5.05)
Northern Cardinal	37.03 (33.75 40.31)	EWLr ($> T_{uc}$)	0.180 (0.161 0.198)	-7.41 (-8.22 -6.61)
Abert's Towhee	36.73 (34.22 39.24)	EWLr ($> T_{uc}$)	0.151 (0.129 0.174)	-6.26 (-7.24 -5.29)
Curve-billed Thrasher	42.61 (40.22 45.00)	EWLr ($> T_{uc}$)	0.391 (0.314 0.468)	-17.17 (-20.71 -13.62)

Notes: Values are means, with 95% confidence intervals in parentheses.

Table S2. Mean and \pm SD values for metabolic variables in seven Sonoran Desert passerine bird species ($T_{\text{air}} \pm 1^\circ\text{C}$)

Species	T_{air} ($^\circ\text{C}$)	RMR (W)	RMR (mW g^{-1})	EWL ($\text{g H}_2\text{O hr}^{-1}$)	EWL (% of Mb hr^{-1})	EHL/MHP	T_{b} ($^\circ\text{C}$)	n
Lesser Goldfinch	35	0.25 \pm 0.05	25.33 \pm 5.37	0.19 \pm 0.05	1.94 \pm 0.51	0.52 \pm 0.10	41.3 \pm 0.7	17
	42	0.28 \pm 0.04	28.92 \pm 4.14	0.41 \pm 0.08	4.18 \pm 0.86	0.97 \pm 0.17	42.7 \pm 0.7	8
	48	0.34 \pm 0.07	35.09 \pm 7.07	0.74 \pm 0.08	7.61 \pm 0.97	1.48 \pm 0.24	43.8 \pm 0.5	7
House Finch	35	0.38 \pm 0.05	21.16 \pm 3.19	0.15 \pm 0.05	0.85 \pm 0.30	0.27 \pm 0.07	41.1 \pm 0.3	8
	42	0.45 \pm 0.06	25.11 \pm 3.81	0.50 \pm 0.10	2.74 \pm 0.61	0.73 \pm 0.13	42.9 \pm 0.4	13
	48	0.54 \pm 0.05	29.65 \pm 3.52	1.20 \pm 0.06	6.63 \pm 0.59	1.51 \pm 0.19	43.9 \pm 0.5	6
Pyrrhuloxia	35	0.65 \pm 0.15	19.45 \pm 4.66	0.66 \pm 0.30	1.98 \pm 0.91	0.66 \pm 0.16	41.0 \pm 1.3	2
	42	0.66 \pm 0.18	19.74 \pm 5.49	0.95 \pm 0.08	2.84 \pm 0.33	0.98 \pm 0.18	42.2 \pm 1.4	2
	48	0.78 \pm 0.14	23.33 \pm 4.45	1.70 \pm 0.03	5.05 \pm 0.40	1.47 \pm 0.23	43.7 \pm 0.1	2
Cactus Wren	35	0.45 \pm 0.05	13.07 \pm 1.64	0.23 \pm 0.08	0.66 \pm 0.23	0.34 \pm 0.10	41.1 \pm 0.8	8
	42	0.49 \pm 0.05	14.26 \pm 1.83	0.66 \pm 0.10	1.90 \pm 0.33	0.90 \pm 0.14	42.3 \pm 0.6	10
	48	0.59 \pm 0.08	17.12 \pm 2.61	1.54 \pm 0.26	4.46 \pm 0.83	1.74 \pm 0.19	43.8 \pm 0.6	8
Northern Cardinal	35	0.62 \pm 0.07	15.80 \pm 2.06	0.35 \pm 0.13	0.88 \pm 0.33	0.37 \pm 0.12	40.8 \pm 0.7	7
	42	0.80 \pm 0.17	20.40 \pm 4.60	1.05 \pm 0.22	2.67 \pm 0.60	0.88 \pm 0.10	42.6 \pm 1.0	6
	48	1.03 \pm 0.15	26.23 \pm 4.16	2.07 \pm 0.27	5.25 \pm 0.77	1.34 \pm 0.05	43.8 \pm 0.2	4
Abert's Towhee	35	0.71 \pm 0.13	16.99 \pm 3.30	0.42 \pm 0.11	1.00 \pm 0.28	0.39 \pm 0.08	42.0 \pm 0.9	18
	42	0.80 \pm 0.14	19.21 \pm 3.61	1.05 \pm 0.15	2.51 \pm 0.40	0.90 \pm 0.20	42.5 \pm 0.4	13
	48	0.85 \pm 0.06	20.34 \pm 2.10	1.98 \pm 0.19	4.74 \pm 0.57	1.56 \pm 0.05	43.7 \pm 0.5	4
Curve-billed Thrasher	35	0.86 \pm 0.09	12.20 \pm 1.87	0.50 \pm 0.16	0.70 \pm 0.25	0.38 \pm 0.11	40.6 \pm 0.4	6
	42	0.93 \pm 0.07	13.14 \pm 1.81	1.36 \pm 0.22	1.92 \pm 0.38	0.98 \pm 0.18	41.9 \pm 0.5	7
	48	1.34 \pm 0.18	18.83 \pm 3.30	3.06 \pm 0.26	4.31 \pm 0.62	1.54 \pm 0.11	43.7 \pm 0.6	6

Table S3. Slope (m) and intercept (b) of metabolic variables as functions of air temperature (T_{air}) in seven Sonoran Desert bird species.

Species	Regression	m			b		
Lesser Goldfinch	RMR > T_{uc}	0.009	(0.005	0.014)	-0.11	(-0.31	0.09)
House Finch	RMR > T_{uc}	0.016	(0.011	0.021)	-0.25	(-0.46	-0.03)
Pyrrhuloxia	RMR > T_{uc}	0.025	(0.010	0.040)	-0.44	(-1.12	0.24)
Cactus Wren	RMR > T_{uc}	0.018	(0.013	0.024)	-0.28	(-0.52	-0.05)
Northern Cardinal	RMR > T_{uc}	0.040	(0.029	0.051)	-0.90	(-1.40	-0.40)
Abert's Towhee	RMR > T_{uc}	0.019	(0.005	0.033)	-0.03	(-0.65	0.59)
Curve-billed Thrasher	RMR > T_{uc}	0.097	(0.058	0.135)	-3.31	(-5.09	-1.53)
Curve-billed Thrasher	RMR > 36°C	0.060	(0.042	0.078)	-1.60	(-2.39	-0.82)
Lesser Goldfinch	EWL > 36°C	0.052	(0.044	0.059)	-1.74	(-2.07	-1.42)
House Finch	EWL > 36°C	0.098	(0.089	0.108)	-3.62	(-4.04	-3.19)
Pyrrhuloxia	EWL > 36°C	0.132	(0.114	0.151)	-4.71	(-5.56	-3.86)
Cactus Wren	EWL > 36°C	0.137	(0.119	0.155)	-5.03	(-5.83	-4.23)
Northern Cardinal	EWL > 36°C	0.180	(0.163	0.198)	-6.50	(-7.28	-5.72)
Abert's Towhee	EWL > 36°C	0.151	(0.129	0.173)	-5.26	(-6.22	-4.30)
Curve-billed Thrasher	EWL > 36°C	0.270	(0.225	0.314)	-9.94	(-11.92	-7.97)
Lesser Goldfinch	EHL/MHP > 36°C	0.083	(0.073	0.094)	-2.53	(-2.98	-2.07)
House Finch	EHL/MHP > 36°C	0.111	(0.100	0.122)	-3.89	(-4.39	-3.40)
Pyrrhuloxia	EHL/MHP > 36°C	0.095	(0.068	0.122)	-3.06	(-4.29	-1.83)
Cactus Wren	EHL/MHP > 36°C	0.124	(0.111	0.137)	-4.20	(-4.78	-3.62)
Northern Cardinal	EHL/MHP > 36°C	0.085	(0.071	0.099)	-2.65	(-3.28	-2.02)
Abert's Towhee	EHL/MHP > 36°C	0.099	(0.080	0.118)	-3.24	(-4.07	-2.40)
Curve-billed Thrasher	EHL/MHP > 36°C	0.090	(0.070	0.110)	-2.77	(-3.65	-1.89)
Lesser Goldfinch	EHL - MHP > 36°C	0.030	(0.026	0.035)	0.02	(0.01	0.04)
House Finch	EHL - MHP > 36°C	0.059	(0.053	0.066)	-0.04	(-0.06	-0.02)
Pyrrhuloxia	EHL - MHP > 36°C	0.088	(0.070	0.106)	-0.02	(-0.08	0.03)
Cactus Wren	EHL - MHP > 36°C	0.096	(0.082	0.111)	0.03	(-0.01	0.08)
Northern Cardinal	EHL - MHP > 36°C	0.110	(0.097	0.122)	0.00	(-0.05	0.05)
Abert's Towhee	EHL - MHP > 36°C	0.101	(0.081	0.122)	0.00	(-0.06	0.06)
Curve-billed Thrasher	EHL - MHP > 36°C	0.166	(0.132	0.200)	-0.01	(-0.12	0.10)
Lesser Goldfinch	T_{b} > 36°C	0.210	(0.159	0.260)	33.82	(31.64	36.00)
House Finch	T_{b} > 36°C	0.177	(0.145	0.209)	35.27	(33.86	36.68)
Pyrrhuloxia	T_{b} > 36°C	0.273	(0.243	0.304)	30.71	(29.12	32.29)
Cactus Wren	T_{b} > 36°C	0.271	(0.234	0.308)	30.88	(29.22	32.53)
Northern Cardinal	T_{b} > 36°C	0.268	(0.211	0.325)	31.26	(28.75	33.78)
Abert's Towhee	T_{b} > 36°C	0.194	(0.162	0.227)	34.37	(32.95	35.79)
Curve-billed Thrasher	T_{b} > 36°C	0.316	(0.277	0.355)	28.59	(26.84	30.34)

Notes: Values are means, with 95% confidence intervals in parentheses.

 T_{air} is the abscissa in all cases but EHL - MHP, where it is $T_{\text{air}} - T_{\text{b}}$.

Table S4. Slope (m) and intercept (b) of (EHL-MHP)/M_b and MHP/M_b as a function of the gradient (T_{air} - T_b) for T_{air} above 36°C in eight Sonoran Desert bird species.

Species	Regression	m			b		
Lesser Goldfinch	(EHL-MHP)/M _b > 36°C	3.16	(2.70	3.61)	2.18	(0.63	3.72)
House Finch	(EHL-MHP)/M _b > 36°C	3.31	(2.94	3.67)	-2.49	(-3.74	-1.25)
Cactus Wren	(EHL-MHP)/M _b > 36°C	2.84	(2.39	3.29)	0.96	(-0.36	2.29)
Northern Cardinal	(EHL-MHP)/M _b > 36°C	2.70	(2.38	3.03)	-0.13	(-1.45	1.20)
Abert's Towhee	(EHL-MHP)/M _b > 36°C	2.38	(1.91	2.85)	0.12	(-1.28	1.52)
Curve-billed Thrasher	(EHL-MHP)/M _b > 36°C	2.25	(1.81	2.69)	-0.19	(-1.69	1.31)
Mourning Dove	(EHL-MHP)/M _b > 36°C	1.10	(1.02	1.18)	1.31	(0.45	2.17)
Gambel's Quail	(EHL-MHP)/M _b > 36°C	0.84	(0.72	0.97)	1.01	(0.20	1.81)
Lesser Goldfinch	MHP/M _b > 36°C	0.93	(0.35	1.52)	29.96	(28.11	31.81)
House Finch	MHP/M _b > 36°C	0.99	(0.65	1.33)	24.93	(23.98	25.89)
Cactus Wren	MHP/M _b > 36°C	0.63	(0.41	0.85)	14.45	(13.78	15.13)
Northern Cardinal	MHP/M _b > 36°C	1.16	(0.72	1.59)	20.50	(17.85	23.14)
Abert's Towhee	MHP/M _b > 36°C	0.57	(0.18	0.96)	18.95	(18.09	19.82)
Curve-billed Thrasher	MHP/M _b > 36°C	0.84	(0.48	1.19)	13.42	(12.31	14.53)
Mourning Dove	MHP/M _b > 36°C	0.09	(0.04	0.14)	6.93	(6.35	7.51)
Gambel's Quail	MHP/M _b > 36°C	0.15	(0.07	0.24)	5.09	(4.67	5.51)

Notes: Values are means, with 95% confidence intervals in parentheses. The abscissa is T_{air} - T_b.
The data for the last 2 species are from Smith et al. (2015).