

This is an electronic appendix to the Biology Letter by Jarošík et al. 2004 A general rule for the dependence of developmental rate on temperature in ectothermic animals. *Proc. R. Soc. Lond. B (Suppl.)* **271**, S219–S221. (DOI 10.1098/rsbl.2003.0145.)

Electronic appendices are refereed with the text. However, no attempt has been made to impose a uniform editorial style on the electronic appendices.

Table 2. Data for the populations studied, divided by taxonomic group, with source references, stages evaluated for each population of a species, number and range of temperatures used in each analysis, results of each ANCOVA test (P-value, intercept and slope \pm standard error SE for each stage evaluated), and violation of proportionality per °C in percentages (violations are calculated before rounding the values for the slopes to two decimal places). All the data for each particular stage evaluated fell within the range of the linear relationship between the rate of development and temperature. Bold indicates significant violation of null hypothesis on developmental proportionality, i.e. the hypothesis on a zero regression slope of proportional development on temperature. Because the regression slope corresponding to a violation of proportionality is unknown, test power is calculated for each data conforming to the null hypothesis, assuming that the observed regression slope violates of proportionality. This results in the observed regression slopes conforming to the null hypothesis being extremely small, which makes it difficult to assess whether the insignificant results are because the test is too weak.

Data References

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Taxonomic group: Species	Reference	Temp. (°C) #1	Range	Stage	Intercept			P	Test Power	Violation (% per °C)
					(angular transformations)	Slope±SE				
Osteichthyes: Teleostei										
<i>Cyprinus carpio</i> L.	Ignatieva (1974)	6	12-26	duration of the first cleavage division beginning of gastrulation yolk covered 10 somites	0.13	0.00047±0.0014	0.003547	-	7.52E-05	
					0.51	0.0052±0.0014			1.36E-03	
					0.72	-0.0049±0.0014			3.75E-03	
<i>Misgurnus fossilis</i> L.	Ignatieva (1974)	5	12-23.5	duration of the first cleavage division beginning of gastrulation yolk covered 10 somites	0.60	-0.00035±0.0014	0.005484	-	1.34E-02	
					0.12	0.00087±0.0027			5.35E-05	
					0.58	0.0037±0.0027			4.53E-04	
<i>Esox lucius</i> L.	Ignatieva (1974)	6	4.1-18	duration of the first cleavage division beginning of gastrulation yolk covered 10 somites	0.70	-0.012±0.0027	0.640792	0.105	8.17E-05	
					0.12	0.00073±0.0018		0.353	5.35E-05	
					0.70	0.0021±0.0018		0.256	4.53E-04	
					0.74	-0.0017±0.0018		0.124	2.95E-04	
					0.33	-0.00090±0.0018		0.055	8.17E-05	
<i>Coregonus peled</i> (Gmelin)	Ignatieva (1974)	3	2.5-4.8	duration of the first cleavage division beginning of gastrulation yolk covered 10 somites	0.13	-0.0011±0.0020	0.929457	0.072	1.30E-04	
					0.70	-0.0048±0.0020		0.136	2.28E-03	
					0.63	0.013±0.0020		0.116	1.76E-02	
					0.48	-0.011±0.0020		0.407	1.22E-02	
<i>Salmo gairdneri</i> Richardson	Ignatieva (1970)	8	4.8-15	duration of the first cleavage division beginning of gastrulation yolk covered 10 somites	0.42	-0.0013±0.0011	0.756405	0.157	1.63E-04	
					0.48	0.00063±0.0011		0.078	3.96E-05	
					0.56	0.00023±0.0011		0.070	5.52E-06	
<i>Tinca tinca</i> L.	Periáz et al. (1989)	5	17.5-27.5	duration of the first cleavage division 4 blastomeres 10 somites	0.05	-0.00018±0.0017	0.000006	-	3.09E-06	
					0.06	0.00035±0.0017			1.25E-05	
					0.33	0.0011±0.0017			1.25E-04	
					0.01	0.0039±0.0017			1.53E-03	
					0.48	-0.0028±0.0017			7.78E-04	
					0.81	-0.029±0.0037			8.28E-02	
					0.73	0.012±0.0023			1.37E-02	
<i>Brachydanio rerio</i> (Hamilton)	Kimmel et al. (1995)	3	25-33	onset of exogenous feeding 8 cells 64 cells 1000 cells dome shield 75% epiboly bud 1-somite 14-somite 20-somite prim5 prim-15 prim-24 high bud long bud pec-fin protruding mouth	0.18	-0.0019±0.0050	0.023830	-	3.45E-04	
					0.00	0.0038±0.0050			1.47E-03	
					0.13	-0.00069±0.0050			4.74E-05	
					0.24	-0.0028±0.0050			7.87E-04	
					0.27	-0.0045±0.0050			2.04E-03	
					0.02	0.0045±0.0050			2.04E-03	
					0.25	-0.0038±0.0050			1.43E-03	
					0.36	-0.0090±0.0050			8.19E-03	
					0.33	-0.0026±0.0050			7.01E-04	
					0.35	-0.0052±0.0050			2.75E-03	
					0.14	0.0036±0.0050			1.30E-03	
					1.08	-0.027±0.0050			7.59E-02	
					0.24	0.0013±0.0050			1.75E-04	
					0.17	0.0053±0.0050			2.86E-03	
					0.10	0.0087±0.0050			7.59E-03	
					0.21	0.0066±0.0050			4.38E-03	
					0.21	0.0072±0.0050			5.14E-03	
Osteichthyes: Chondrostei										
<i>Acipenser stellatus</i> Pallas	Detlaff & Ginzburg (1954)	5	15.4-22.1	beginning of gastrulation horseshoe-shaped blastoporus closure of neural canal occurrence of tail bud tail touches head	0.43	0.0024±0.0050	0.751113	0.120	5.70E-04	
					0.34	0.0056±0.0052		0.334	3.19E-03	
					0.33	-0.0040±0.0052		0.205	1.60E-03	
					0.49	-0.0038±0.0052		0.190	1.42E-03	
					0.69	-0.0016±0.0052		0.091	2.56E-04	

Taxonomic group: Species	Reference	Temp. (°C) #1	Stage Range	Intercept		P	Test Power	Violation (% per °C)
				(angular transformations)	Slope±SE			
<i>Acipenser gusidenstaedti</i> Brandt	Detlaff & Ginzburg (1954)	7	11.8-24.4 beginning of gastrulation	0.34	0.0036±0.0070	0.445131	0.159	1.33E-03
<i>Huso huso</i> L.	Detlaff & Ginzburg (1954)	3	9.8-15.2 beginning of gastrulation	0.40	-0.00096±0.0070	0.156340	0.078	9.31E-05
				0.33	-0.0053±0.0070		0.235	2.79E-03
				0.18	0.015±0.0070		0.179	2.38E-02
				0.28	0.0025±0.0080		0.109	6.17E-04
				0.61	0.0042±0.0080		0.162	1.77E-03
Amphibia: Anura <i>Xenopus laevis</i> Daudin	Detlaff & Rudneva (1973)	3	17-22 blastoporus	0.90	-0.0015±0.0064	0.998589	0.072	2.19E-04
				0.44	0.00078±0.0064		0.060	6.04E-05
				0.31	0.00043±0.0064		0.055	1.81E-05
<i>Rana temporaria</i> L.	Detlaff (1985)	5	5-24 beginning of gastrulation	0.33	0.00084±0.0064	0.205086	0.061	7.13E-05
				0.70	0.0027±0.0019		0.414	7.50E-04
				0.87	-0.0027±0.0019		0.414	7.50E-04
<i>Rana temporaria</i> L.	Grainger (1959)	5	11-25 200 cells	0.08	0.0037±0.0021	0.355177	0.841	1.39E-03
				0.19	0.00035±0.0021		0.082	1.22E-05
				0.22	-0.0012±0.0021		0.170	1.39E-04
<i>Bombina variegata</i> L.	Pawlowska-Indyk (1980)	6	12.4-27.9 late blastula	0.24	0.00091±0.0021	0.003121	0.135	8.23E-05
				0.23	0.0041±0.0021		0.985	1.70E-03
				0.48	-0.0025±0.0021		0.449	6.41E-04
				0.38	-0.0016±0.0021		0.219	2.25E-04
				0.74	-0.00059±0.0021		0.103	3.53E-05
				-1.69	0.019±0.015		-	3.81E-02
				-1.01	0.015±0.015		-	2.41E-02
				7.28	-0.065±0.015		-	4.29E-01
				-2.56	0.031±0.015		-	9.38E-02
				0.24	0.014±0.0058		0.040280	1.97E-02
<i>Rana sylvatica</i> Le Conte	Moore (1939)	3	10-18.5 development of <i>Rana sylvatica</i> . Anat. Rec. 68, 489-496 (1937)	0.35	-0.0075±0.0058	0.994105	0.053	1.65E-05
				0.27	0.00023±0.0058		0.087	1.40E-03
				0.28	0.0010±0.0058		0.084	1.18E-03
				0.28	0.0012±0.0058		0.102	2.34E-03
				0.58	-0.019±0.0058		0.105	2.54E-03
				-0.11	0.021±0.0058		0.110	2.83E-03
				0.47	-0.0038±0.0058		0.349	8.96E-03
				0.49	-0.0012±0.0058		0.052118	0.552118
				0.39	-0.0004±0.013		0.074	2.89E-04
				0.27	0.0037±0.013		0.227	5.00E-03
				0.34	0.0034±0.013		0.495	1.36E-02
				0.58	-0.0048±0.013		0.268	6.35E-03
				0.56	-0.0050±0.013			
0.30	0.0053±0.013							
0.49	-0.0095±0.0063							
<i>Rana pipiens</i> Schreber	Moore (1939)	4	15.6-26.7 13 (stages defined by Pollister, A. W., & Moore, J. A. Tables for the normal development of <i>Rana sylvatica</i> . Anat. Rec. 68, 489-496 (1937))	0.32	0.0017±0.0063	0.552118	0.074	2.89E-04
				0.23	0.0071±0.0063		0.227	5.00E-03
				0.18	0.012±0.0063		0.495	1.36E-02
				0.73	-0.0080±0.0063		0.268	6.35E-03
				0.32	0.0017±0.0063			
				0.23	0.0071±0.0063			
				0.18	0.012±0.0063			
				0.73	-0.0080±0.0063			
<i>Rana pelusistris</i> Le Conte	Moore (1939)	4	15.5-25.7 10 (stages defined by Pollister, A. W., & Moore, J. A. Tables for the normal development of <i>Rana sylvatica</i> . Anat. Rec. 68, 489-496 (1937))	0.32	0.0017±0.0063	0.552118	0.074	2.89E-04
				0.23	0.0071±0.0063		0.227	5.00E-03
				0.18	0.012±0.0063		0.495	1.36E-02
				0.73	-0.0080±0.0063		0.268	6.35E-03
				0.32	0.0017±0.0063			
				0.23	0.0071±0.0063			
				0.18	0.012±0.0063			
				0.73	-0.0080±0.0063			

Taxonomic group: Species	Reference	Temp. (°C) #1	Stage Range	Intercept (angular transformations)	Slope±SE	P	Test Power (% per °C)	Violation (% per °C)				
<i>Rana clamitans</i> Latreille	Moore (1939)	3	15-25.3	19	0.53 -0.0036±0.0063	0.946082	0.112	1.27E-03				
				18 (stages defined by Pollister, A. W., & Moore, J. A. Tables for the normal development of <i>Rana sylvatica</i> . Anat. Rec. 68, 489-496 (1937))	0.78 0.0034±0.0027		0.057	1.16E-03				
				19	0.88 -0.0086±0.027		0.070	7.44E-03				
				stadium I	0.38 0.0074±0.0066	0.685976	0.347	5.53E-03				
				stadium II	0.30 0.00084±0.0066		0.064	7.04E-05				
				stadium III	0.27 0.0020±0.0066		0.090	4.03E-04				
				stadium IV	0.28 0.0054±0.0066		0.218	2.90E-03				
<i>Rana fusca</i> Blyth	Hertwig (1898)	4	6-20	stadium V	0.46 -0.011±0.0066		0.627	1.12E-02				
				stadium VI	0.51 -0.0027±0.0066		0.109	7.37E-04				
				stadium VII	0.46 -0.0018±0.0066		0.085	3.28E-04				
				16 blastomeres	0.22 0.00022±0.00067	0.217692	0.107	4.68E-06				
				early blastula 1	0.12 0.00028±0.00067		0.129	7.95E-06				
				early blastula 2	0.16 0.00053±0.00067		0.249	2.83E-05				
				middle blastula	0.27 -0.00043±0.00067		0.192	1.83E-05				
Amphibia: Caudata <i>Salamandrella keyserlingi</i> (Dybowski)	Berman et al. (1987)	4	12-24	beginning of gastrulation	0.26 -0.00046±0.00067		0.207	2.09E-05				
				horseshoe-shaped blastoporus	0.26 -0.00026±0.00067		0.120	6.57E-06				
				yolk plug	0.26 0.00052±0.00067		0.244	2.74E-05				
				beginning of neurulation	0.29 -0.00037±0.00067		0.062	1.36E-07				
				approaching of neural plates	0.26 0.00052±0.00067		0.244	2.74E-05				
				closure of neuroporus	0.20 -0.0017±0.00067		0.453	2.95E-04				
				5 cerebral lobes	0.11 0.0019±0.00067		0.632	3.68E-04				
				eye lobes	0.19 -0.0012±0.00067		0.898	1.50E-04				
				tail bud	0.16 -0.00032±0.00067		0.143	1.00E-05				
				gills visible	0.17 0.00060±0.00067		0.296	3.66E-05				
				beginning of eye pigmentation	0.16 0.00088±0.00067		0.520	7.72E-05				
				gill basis divided	0.28 -0.00038±0.00067		0.170	1.46E-05				
				beginning of body pigmentation	0.28 0.00036±0.00067		0.159	1.28E-05				
				3 branchial archs	0.28 0.000043±0.00067		0.063	1.84E-07				
				balancers visible	0.34 -0.00057±0.00067		0.270	3.20E-05				
				Annelida: <i>Tubifex tubifex</i> Mueller	Mesczerjakov (1975)	3	13-23	base of ventral ganglia	0.62 -0.0026±0.0016	0.007991	-	6.99E-04
								24-27 somits; gonoblasts	0.04 0.0084±0.0016			7.12E-03
								base of chaetal sacs	0.12 0.0025±0.0016			6.23E-04
								first body coil	0.44 -0.0062±0.0016			3.89E-03
								two body coils	0.42 -0.0022±0.0016			5.07E-04
hatching	0.60 0.0040±0.0016							1.64E-03				
first cleavage 1a	0.01 0.0048±0.0030	0.556132	0.711					2.27E-03				
first cleavage 1b	0.07 -0.00027±0.0030		0.070					7.50E-06				
first cleavage 2b	0.06 -0.00031±0.0030		0.072					9.44E-06				
2 blastomeres	0.11 -0.00048±0.0030		0.081					2.32E-05				
4 blastomeres	0.08 -0.000011±0.0030		0.059					1.15E-08				
8 blastomeres	0.07 0.0012±0.0030		0.131					1.53E-04				
16 blastomeres	0.09 -0.0024±0.0030		0.253					5.75E-04				
32 blastomeres	0.10 -0.00069±0.0030		0.093	4.78E-05								
middle blastula 1	0.22 -0.0010±0.0030		0.117	1.10E-04								
middle blastula 2	0.14 -0.000019±0.0030		0.059	3.51E-08								
early gastrula 1	0.24 -0.00099±0.0030		0.112	9.76E-05								
Echinodermata: <i>Strongylocentrotus droebachiensis</i> Mueller	Stephens (1972)	3	0-8	first cleavage 1a	0.01 0.0048±0.0030	0.556132	0.711	2.27E-03				
				first cleavage 1b	0.07 -0.00027±0.0030		0.070	7.50E-06				
first cleavage 2b	0.06 -0.00031±0.0030		0.072	9.44E-06								
2 blastomeres	0.11 -0.00048±0.0030		0.081	2.32E-05								
4 blastomeres	0.08 -0.000011±0.0030		0.059	1.15E-08								
8 blastomeres	0.07 0.0012±0.0030		0.131	1.53E-04								
16 blastomeres	0.09 -0.0024±0.0030		0.253	5.75E-04								
32 blastomeres	0.10 -0.00069±0.0030		0.093	4.78E-05								
middle blastula 1	0.22 -0.0010±0.0030		0.117	1.10E-04								
middle blastula 2	0.14 -0.000019±0.0030		0.059	3.51E-08								
early gastrula 1	0.24 -0.00099±0.0030		0.112	9.76E-05								

Taxonomic group: Species	Reference	Temp. (°C) #1	Range	Stage	Intercept (angular transformations)	Slope±SE	P	Test Power	Violation (% per °C)
				middle. gastrula	0.25	-0.0039±0.0030		0.507	1.50E-03
				late gastrula	0.19	0.0027±0.0030		0.297	7.33E-04
				prism	0.26	0.00065±0.0030		0.090	4.24E-05
				early pluteus	0.35	-0.0071±0.0030		0.309	5.04E-03
				middle pluteus 1	0.37	0.0058±0.0030		0.965	3.31E-03
				middle pluteus 2	0.70	0.0020±0.0030		0.204	3.99E-04