

Supplementary Information: Additional file 1

Table S1 Table of model selection for the trend analysis of weight variation of paedomorphic palmate newts during the experiment. (A) for newts that did not metamorphose (in the high water level treatment) and (B) for those that metamorphosed (in the low water level treatment). The structure indicates the linear combination of explanatory terms introduced in the mode with S : sex, T : temperature, l : time (linear), q : time (quadratic). wAIC: Akaike's weight. Only the best supported models according to their AIC are presented (i.e. $\Delta AIC \leq 2$).

Dataset	Structure	Deviance	Number of parameters	wAIC
A. Newts that did not metamorphose	$S+T+l+q+S*T+S*l+S*q+T*q+S*T*q$	-5299.2	13	0.11782
	$S+T+l+q+S*T+S*q+T*q+S*T*q$	-5297.0	12	0.10905
	$S+T+l+q+S*q+T*q$	-5292.6	10	0.08983
	$S+T+q+S*T+S*q+T*q+S*T*q$	-5294.3	11	0.07600
	$S+T+q+S*q+T*q$	-5289.9	9	0.06358
	$S+T+l+q+S*T+S*l+S*q+T*l+T*q+S*T*q$	-5299.8	14	0.05981
	$S+T+l+q+S*T+S*q+T*l+T*q+S*T*q$	-5297.8	13	0.05920
	$S+T+l+q+S*T+S*l+S*q+T*q$	-5295.6	12	0.05329
	$S+T+l+q+S*l+S*q+T*l+T*q$	-5295.4	12	0.04823
B. Newts that metamorphosed	$S+T+l+q+S*l+S*q+T*l+T*q$	-2022.2	12	0.20200
	$S+T+l+q+S*T+S*l+S*q+T*l+T*q+S*T*l$	-2025.4	14	0.13354
	$S+T+l+q+S*T+S*l+S*q+T*l+T*q$	-2023.0	13	0.11198
	$S+T+l+q+S*T+S*l+S*q+T*l+T*q+S*T*q$	-2024.7	14	0.09570
	$S+T+l+q+S*T+S*l+T*l+T*q+S*T*l$	-2022.2	13	0.07676

Supplementary Information: Additional file 2

Table S2 Model-averaged estimates and wAIC relative support for each effect implemented in the trend analysis of body weight for the paedomorphic palmate newts that do not metamorphose during the first 70 days of the experiment. *S* for sex (contrast male vs female), *T* for temperature treatment (contrast high vs low), *l* for mean linear effect of time and *q* for mean quadratic effect of time. Relative support was only calculated for explanatory terms that included either the linear or quadratic effect of time.

Effect	Estimate $\pm$ SE	Relative Support
<i>Intercept</i>	1.344 $\pm$ 0.027	-
<i>S</i>	-0.357 $\pm$ 0.054	-
<i>T</i>	-0.136 $\pm$ 0.055	-
<i>S*T</i>	0.107 $\pm$ 0.111	-
<i>l</i>	-0.708 $\pm$ 0.180	> 100
<i>l*S</i>	1.055 $\pm$ 0.375	42
<i>l*T</i>	0.043 $\pm$ 0.151	4.6
<i>l*S*T</i>	0.062 $\pm$ 0.148	2.6
<i>q</i>	0.705 $\pm$ 0.090	> 100
<i>q*S</i>	-0.134 $\pm$ 0.173	4.6
<i>q*T</i>	0.270 $\pm$ 0.196	10.9
<i>q*S*T</i>	-0.611 $\pm$ 0.535	4.6

Supplementary Information: Additional file 3

Table S3 Overall weight loss observed for metamorphosing and not metamorphosing paedomorphs according to each sex and the temperature treatment. Δw_m represents the mass loss (in g) between the day 7 (after acclimation) and the day of metamorphosis for the metamorphosing paedomorphs or the day 41 (mean date of metamorphosis) for the not metamorphosing paedomorphs. For this latter group, Δw_{85} is the mass loss computed on the whole experiment duration (i.e. until day 85). $\% \Delta w$ correspond to the percentage of body mass loss. n_1 and n_2 : sample sizes of metamorphosing and not metamorphosing paedomorphs, respectively. A Wilcoxon exact test was used to examine the difference in percentage weight loss between metamorphosing and not metamorphosing paedomorphs, for each sex and temperature.

		Low temperature		High temperature	
		Metamorphosing	Not metamorphosing	Metamorphosing	Not metamorphosing
Females	Δw_m	-0.29 ± 0.08	-0.07 ± 0.14	-0.27 ± 0.07	-0.15 ± 0.08
	$\% \Delta w_m$	-18.1 ± 3.0	-4.0 ± 7.5	-19.4 ± 3.7	-9.6 ± 4.7
	Δw_{85}		-0.06 ± 0.2		-0.06 ± 0.13
	$\% \Delta w_{85}$		-2.9 ± 12.1		-4.0 ± 7.7
		Wilcoxon test: $W = 48, n_1 = 9, n_2 = 10, P < 0.002$		Wilcoxon test: $W = 39, n_1 = 7, n_2 = 9, P < 0.031$	
Males	Δw_m	-24.2 ± 0.07	-0.11 ± 0.09	-15.8 ± 10.3	-0.03 ± 0.07
	$\% \Delta w_m$	-20.1 ± 5.3	-8.7 ± 6.8	-13.7 ± 8.3	-1.7 ± 5.8
	Δw_{85}		-0.04 ± 0.14		-0.02 ± 0.25
	$\% \Delta w_{85}$		-2.9 ± 10.6		-3.9 ± 19.7
		Wilcoxon test: $W = 77, n_1 = 8, n_2 = 7, P < 0.014$		Wilcoxon test $W = 83, n_1 = 9, n_2 = 8, P < 0.158$	

Supplementary Information: Additional file 4

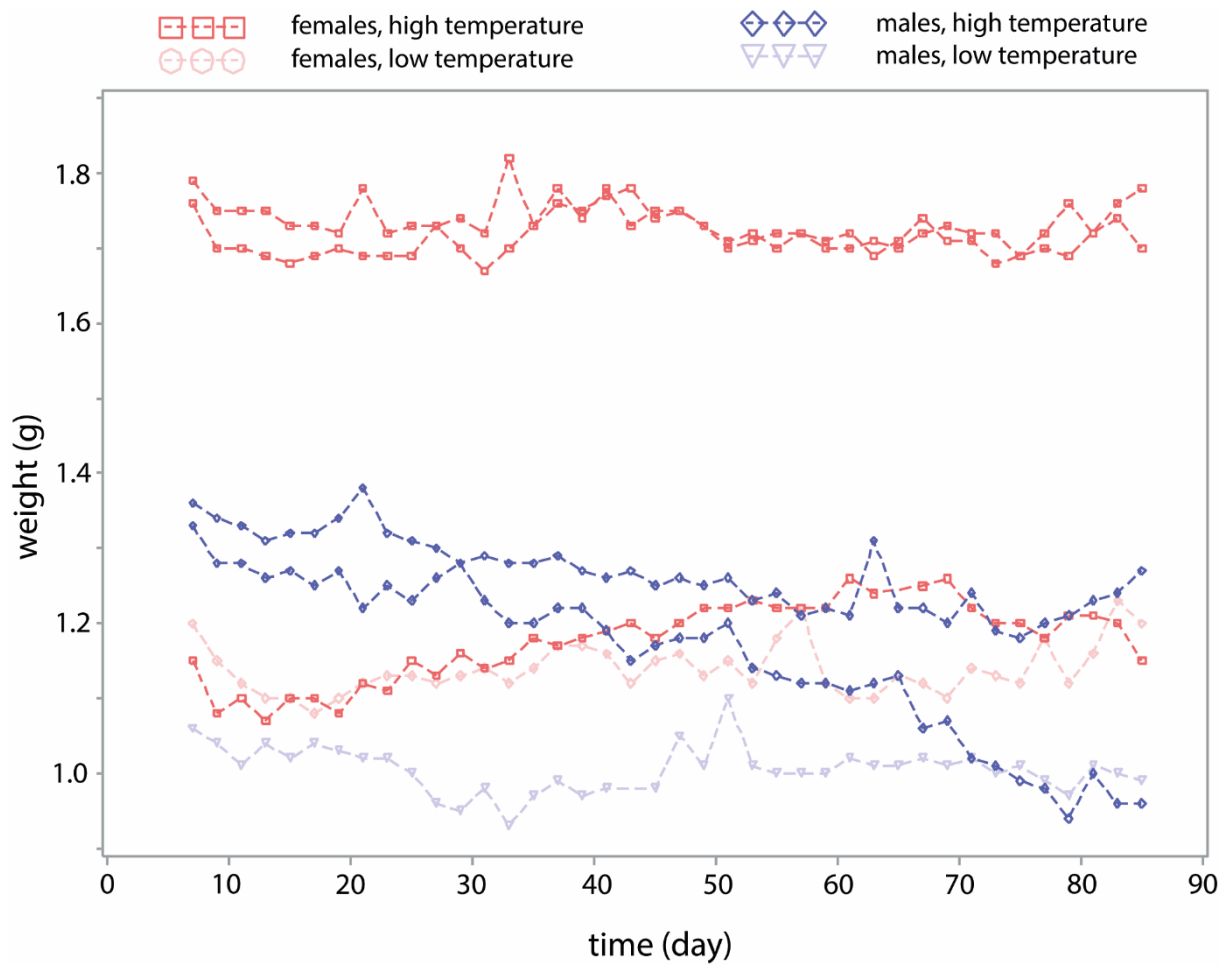


Fig. S1 Weight variation over time in pedomorphs that do not metamorphose in the low water level treatment. Dotted lines: individual patterns.

Supplementary Information: Additional file 5

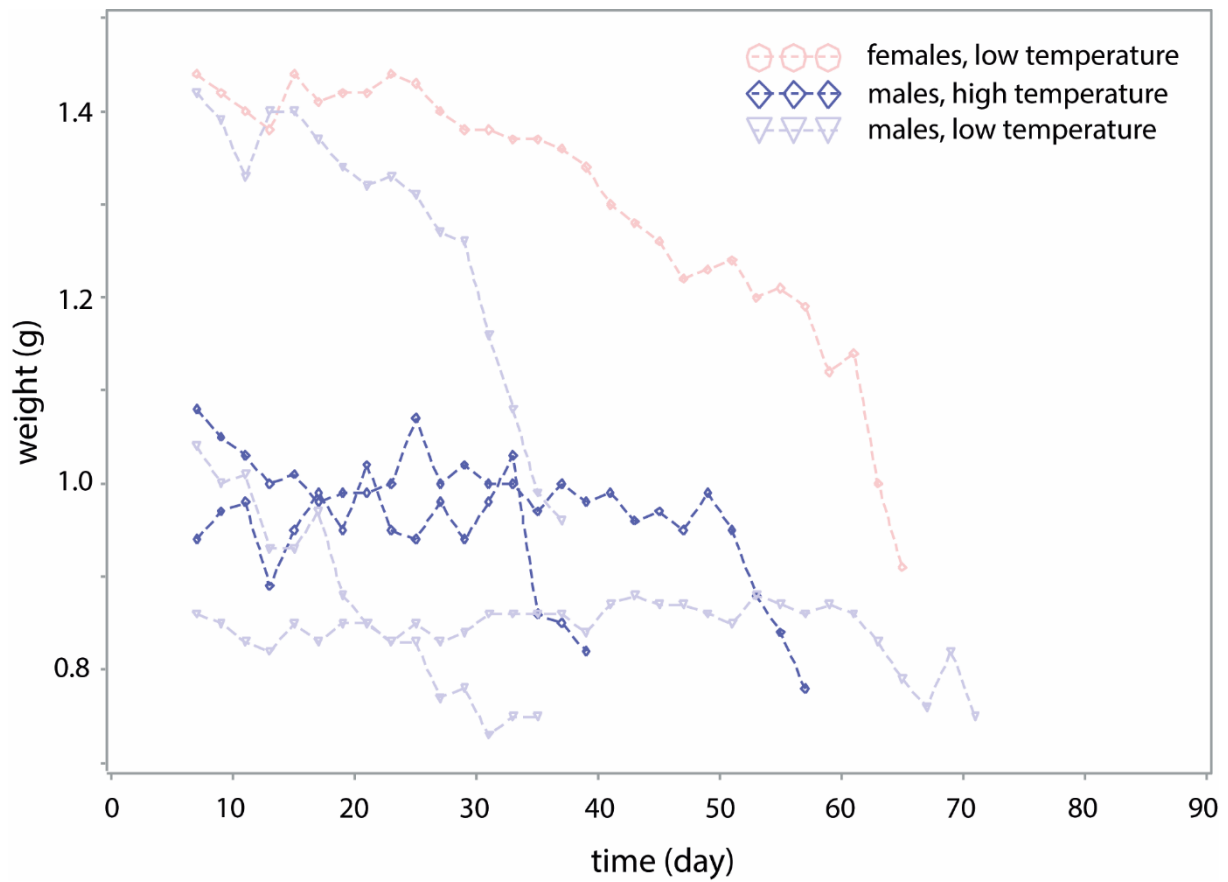


Fig. S2 Weight variation over time in metamorphosing paedomorphs in the high water level treatment. Dotted lines: individual patterns.

Supplementary Information: Additional file 6

Table S4 Food intake of metamorphosing newts (in the low water level treatment) as a function of time period (before and after the onset of the maximum decay period), sex, and temperature treatment, as well as their first-order interactive effects. Estimates are done on the logit scale. The intercept corresponds to the male exposed to the low-temperature treatment after the onset of the maximum decay period. All parameters retained in the final model are indicated by the significant fixed effects according to the F tests. Note that F -tests are not calculated on parameter estimates, but on each explanatory term (i.e., time period, sex, temperature, and their interactive effects), so that the test for each main effect corresponds to the average difference between the two modalities (marginalizing the effect of other effects). See Additional file 7: Table S5 for contrast tests performed according to the final model.

Effect	Estimate $\pm$ SE	F statistic	P
intercept	-1.04153 ± 0.3774	—	—
Period	1.8177 ± 0.5099	$F_{1,45.16} = 95.19$	< 0.0001
Sex	0.2263 ± 0.4303	$F_{1,32.19} = 11.26$	0.0020
Temperature	1.2226 ± 0.4304	$F_{1,45.53} = 22.94$	< 0.0001
Period*Sex	2.1152 ± 0.6578	$F_{1,28.65} = 10.34$	0.0032
Period*Temperature	1.6294 ± 0.7553	$F_{1,43.56} = 4.65$	0.0365
Sex*Temperature	-0.2660 ± 0.7827	$F_{1,34.01} = 0.12$	0.7361

Supplementary Information: Additional file 7

Table S5 Results of the contrast tests comparing odds ratio of food intake between the two periods (i.e. before and after the onset of the maximum degrowth period) for each combination of sex and temperature treatment. All contrasts are done alongside the final model. CI: Confidence intervals.

Contrast (before vs after)	Odds ratio [CI95%]	<i>F</i> statistic	<i>P</i>
within female and high temperature	260.44 [57.0738 ; 1188.43]	$F_{1, 57.6} = 53.81$	< 0.0001
within male and high temperature	31.4098 [7.8402 ; 125.84]	$F_{1, 47.32} = 24.96$	< 0.0001
within female and low temperature	51.0568 [17.7572 ; 146.80]	$F_{1, 26.26} = 58.53$	< 0.0001
within male and low temperature	6.1576 [2.1367 ; 17.7456]	$F_{1, 21.6} = 12.71$	0.0018

Supplementary Information: Additional file 8

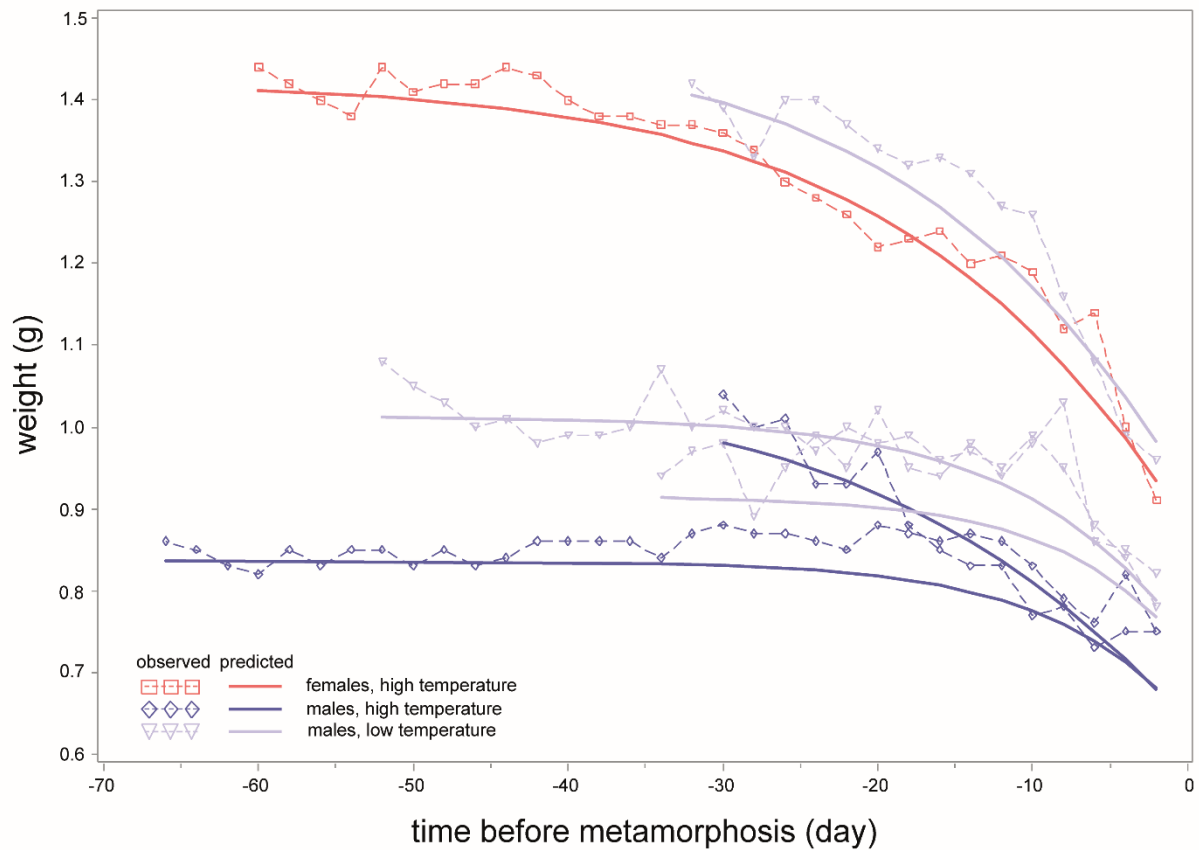


Fig. S3 Body weight degrowth curves of metamorphosing paedomorphic palmate newts in the high water level treatment. Time is indicated backwards from the completion of metamorphosis (i.e. day 0 being the time at which metamorphosis is completed). Sex and temperature treatment are indicated for convenience but were not included in the fitted model. Thick lines: predicted curve including both subject random effect and fixed ones; dotted lines: individual patterns. See Additional file 9: Table S6 for parameter estimates of the Gompertz model.

Supplementary Information: Additional file 9

Table S6 Parameter estimates of the final Gompertz model for the weight loss of metamorphosing newts in the high water treatment.

Parameter	Estimate $\pm$ SE	IC 95%	t_4	P
a_0	1.1763 ± 0.0754	[0.9669 ; 1.3856]	15.60	< 0.0001
b_0	0.0867 ± 0.009	[0.06170 ; 0.1117]	9.63	0.0007
c_0	-10.7120 ± 1.2329	[-14.1352 ; -7.2888]	-8.69	0.0010
$\sigma_{a_{0i}}^2$	0.0633 ± 0.0033	[-0.0276 ; 0.1542]	1.93	0.1252
cov_{ab0i}	-0.00615 ± 0.0031	[-0.0146 ; 0.0023]	-2.01	0.1148
$\sigma_{b_{0i}}^2$	0.0009 ± 0.0004	[-0.0003 ; 0.0022]	2.17	0.0963
σ_{res}^2	0.0010 ± 0.0001	[0.0006 ; 0.0013]	7.88	0.0014

a_0 : mean initial weight (i.e. at day 6 before metamorphosis), **b_0** overall maximal degrowth rate, **c_0** mean time of inflection, **$\sigma_{a_{0i}}^2$** subject random effect on initial weight, **cov_{ab0i}** covariance between subject random effects, **$\sigma_{b_{0i}}^2$** subject random effect on degrowth rate, **σ_{res}^2** residual variance. All parameters retained in the final model are shown in bold (i.e. significant fixed and random effects). Note that the time frame is reversed, i.e. from the metamorphosis to the beginning of the experiment, the **c_0** value indicates therefore that the average inflexion time is estimated after the metamorphosis (11 days) so that the duration of the maximal degrowth period is no longer in males than in females.

Supplementary Information: Additional file 10

Table S7 Number of newts that metamorphosed in each treatment (water level and temperature) for both sexes. The sample size for each sex in each treatment combination is 10 per group ($n = 80$ newts in total).

		Water level	
		low	high
Temperature	low	9 females	0 females
		8 males	3 males
	high	7 females	1 female
		9 males	2 males

Supplementary Information: Additional file 11

Text S1 Curve analyses of the weight variation in metamorphosing paedomorphic palmate newts in the high water treatment.

Of the 40 animals placed in the high water treatment, only 6 metamorphosed (1 female and 2 males in the high temperature treatment, 3 males in the low temperature level). In order to examine the weight loss of these individuals, we implemented a Gompertz model in the same way as the one used to examine the weight loss of metamorphosing newts placed in the low water treatment, except that both the effect of sex and that of the temperature treatment were discarded from the model. Although the parameter estimates should be interpreted with caution given the small sample size and the absence of sex and temperature effects in the model, these results (Additional file 8: Figure S3 and Additional file 9: Table S6) indicate that metamorphosing newts in the high water level treatment also experienced a weight loss roughly comparable to that experienced by metamorphosing newts in the low water treatment.