Table S3 Results for the selection of among-individual (co)variances model structures.

[a]Model(I)	k	k(G)	k(I)	AIC	BIC	REML	k	k(G)	k(I)	AIC	BIC	REML	X[2]	DF	[a]P
				Homogeneous variances for Cross-by-Maturity						Heterogeneous variances for Cross-by-Maturity					
A															
GLM	5	4	1	-4310.0	-4277.8	2160.0	19	4	15	-4548.4	-4426.4	2293.2	266.5	14	< 0.001
GLMH	9	4	5	-4295.0	-4237.2	2156.5	79	4	75	-4434.7	-3927.3	2296.4	279.7	70	< 0.001
CS	13	11	2	-14995.5	-14912.0	7510.8	cf	cf	30	cf	cf	cf	NA	NA	NA
CSH	16	10	6	-15012.7	-14910.0	7522.4	101	11	90	-15063.1	-14414.4	7632.6	220.4	85	< 0.001
AR(1)	cf	cf	2	cf	cf	cf	cf	cf	30	cf	cf	cf	NA	NA	NA
ARH(1)	cf	cf	6	cf	cf	cf	104	14	90	-16852.7	-16184.7	8530.4	NA	NA	NA
ANTE(1)	20	11	9	-17403.9	-17275.2	8721.9	148	13	135	-17466.9	-16516.3	8881.5	319.1	128	< 0.001
ANTE(2)	26	14	12	-17571.9	-17404.9	8812.0	193	13	180	-17581.5	-16341.9	8983.8	343.6	167	< 0.001
ANTE(3)	28	14	14	-17573.3	-17393.5	8814.7	224	14	210	*-17582.7*	-16143.9	9015.3	401.3	196	< 0.001
UN	26	11	15	-17555.7	-17388.7	8803.9	235	10	225	-17572.9	-16063.5	9021.4	435.1	209	< 0.001
RC	21	18	3	-16742.9	-16608.0	8392.5	63	18	45	-16774.9	-16370.3	8450.4	116.0	42	< 0.001
RCS	19	15	4	-17409.5	-17287.4	8723.7	75	15	60	-17448.3	*-16966.6*	8799.1	150.8	56	< 0.001
RCSC	29	14	15	-17400.2	-17213.9	8729.1	cf	cf	225	cf	cf	cf	NA	NA	NA
B															
GLM	4	3	1	-15056.5	-15030.8	7532.2	18	3	15	-15321.5	-15205.9	7678.8	293.1	14	< 0.001
GLMH	8	3	5	-15052.6	-15001.2	7534.3	78	3	75	-15208.9	-14707.9	7682.4	296.3	70	< 0.001
CS	9	7	2	-28041.2	-27983.4	14029.6	38	8	30	-28220.5	-27976.4	14148.2	237.3	29	< 0.001
CSH	12	6	6	-28118.1	-28041.0	14071.0	97	7	90	-28324.6	-27701.6	14259.3	376.6	85	< 0.001
AR(1)	cf	cf	2	cf	cf	cf	cf	cf	30	cf	cf	cf	NA	NA	NA
ARH(1)	cf	cf	6	cf	cf	cf	cf	cf	90	cf	cf	cf	NA	NA	NA
ANTE(1)	18	9	9	-31127.0	-31011.4	15581.5	144	9	135	-31256.0	-30331.1	15772.0	381.0	126	< 0.001
ANTE(2)	cf	cf	12	cf	cf	cf	187	7	180	-31431.9	-30230.9	15903.0	NA	NA	NA
ANTE(3)	cf	cf	14	cf	cf	cf	218	8	210	-31506.7	-30106.5	15971.3	NA	NA	NA

[a]Model(I)	k	k(G)	k(I)	AIC	BIC	REML	k	k(G)	k(I)	AIC	BIC	REML	X²	DF	[a]P
				Homogeneous variances for Cross-by-Maturity						**Heterogeneous variances for Cross-by-Maturity**					
UN	28	13	15	-31428.4	-31248.6	15742.2	235	10	225	*-31527.0*	-30017.6	15998.5	512.6	207	< 0.001
RC	17	14	3	-30771.2	-30662.0	15402.6	60	15	45	-30848.1	-30462.7	15484.0	162.9	43	< 0.001
RCS	22	18	4	-31395.0	-31253.7	15719.5	78	18	60	-31517.1	*-31016.1*	15836.5	234.0	56	0.000
RCSC	33	18	15	-31387.0	-31175.1	15726.5	cf	cf	225	cf	cf	cf	NA	NA	NA

NA: evaluation not available

cf: convergence failed

The suffix 'H' to a model name indicates heterogeneous variances across *Time*

GLM: general linear model (common variance, no covariance)

CS: compound symmetry (common variance, common covariance)

AR(1): autoregressive order 1 (common variance, covariances decline exponentially between *Time* levels with increasing lag)

ANTE(i): antedependence of order i (heterogeneous variances across *Time*, heterogeneous covariances for distance between *Time* levels up to lag i)

UN: unstructured (heterogeneous variances across *Time*, heterogeneous covariances among all variances)

RC: random coefficients (variance for both individual intercepts and slopes, including the covariance between intercept and slope)

RCS: RC with individual splines (like RC but additional individual-based splines, independent of RC effects).

RCSC: RCS with all possible covariances among three spline variances and both RC variances (like RCS but splines are additionally not independent of the remaining RC effects)

[a]The comparisons are only approximations as among-group random effects terms varied among covariance structures and have not been tested for significance

Comments: Models are for response of body mass (A) or fork length (B). For each (co)variance model (Model(I)), the number of (co)variance parameters are indicated for the total (k), for among-groups (k(G)), and for among-individuals (k(I)). For each successfully fitted model, the AIC, BIC (both in "smaller is better" form, best model for each trait in italic) and the log residual maximum likelihood (REML) are given. Each among-individual covariance model was fitted with either homogeneous or heterogeneous parameters among the 15 *Cross*-by-*Maturity* groups. For each model, the improvement in model fit by the heterogeneous version was assessed by likelihood ratio test (LRT) for which the

test statistic (χ^2), degrees of freedom (DF), and the approximated probability (P) are given. As the heteroscedastic models were always better as clearly indicated by LRTs, we ignored the homoscedastic versions for among-model comparisons. All models were fitted with the same fixed full structure (*Sediment*Salinity*Cross*Maturity*Time*) and with all possible random spline (spl(*Time*)) and random deviation (dev(*Time*)) among-group terms (spl(*Time*)/(*Sediment*Salinity*Cross*Maturity*)+dev(*Time*)/(*Sediment*Salinity*Cross*Maturity*). In the model equation asterisks indicate factor crossing (main effects plus interactions), and slashes indicates nesting (main effects to the left of the slash plus their interactions with effects to the right of the slash). Furthermore, all models were fitted with error terms for tank identification (*Tank*), and *Tank*:*Time*, as well as random spline and deviation terms for *Tank*. All random parameters that converged to zero were removed before model evaluation except for *Tank* and *Tank*:*Time* which were always retained to account for the splits-plot design. As models account differently for the variance across *Time*, parameters that converged to zero differed among models and that is the reason why k(G) differ among models.