Supplementary Material

1 Body size results

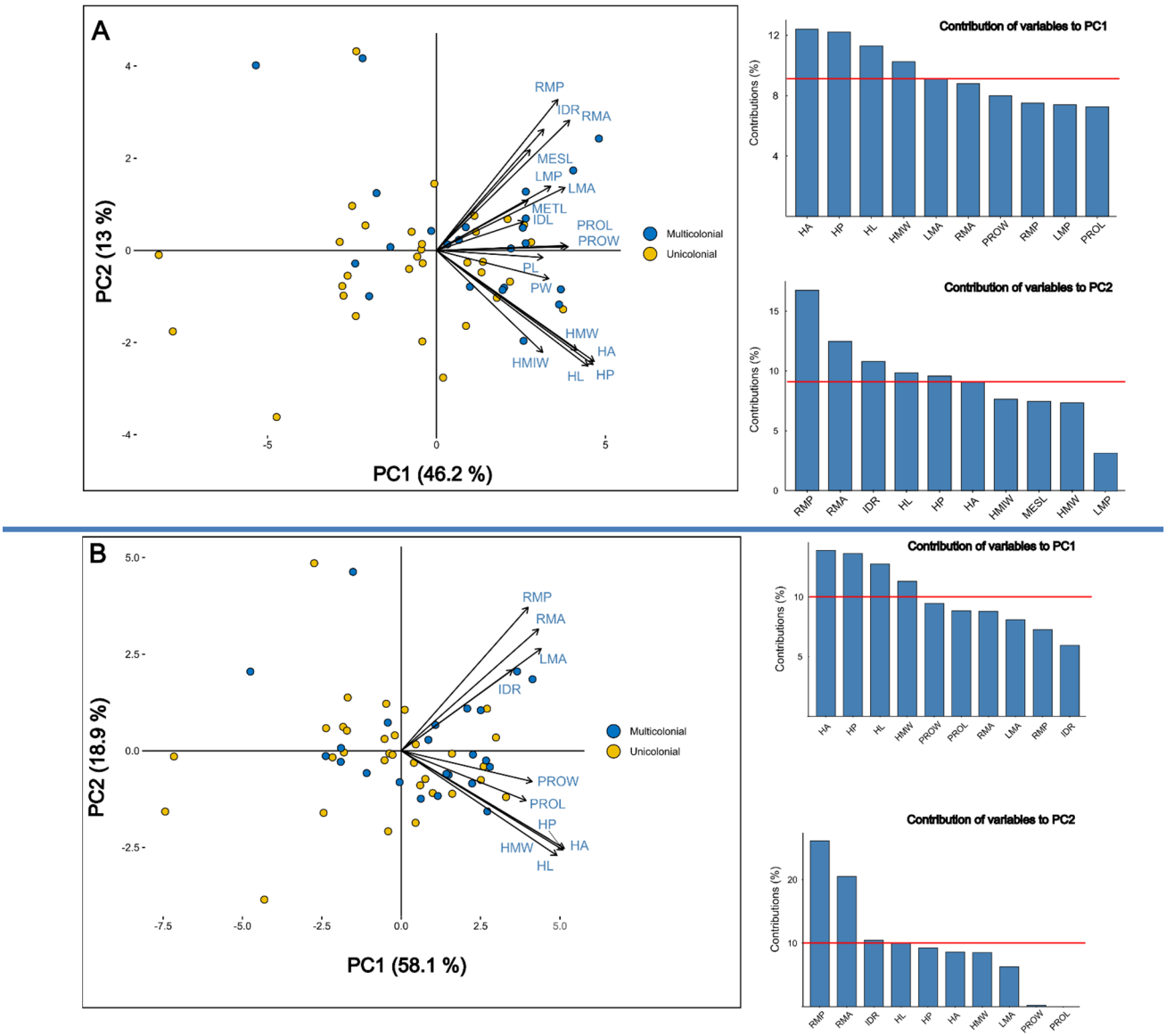

Figure S1: Principal Component Analysis (PCA) of body size metrics of *Neotermes chilensis* soldiers from unicolonial (yellow circles) and multicolonial (blue circles) scapes (See Table 1 for variable abbreviations). Bar charts at the right panel show the ten traits mostly contributing to each principal component. (A) PCA performed with 17 traits and (B) with only the 10 most contributed traits to the variation of body size metrics between unicolonial and multicolonial soldiers. The overall pattern of correlations between metrics showed that variations were concentrated along the first two PCA axis. The contributions of variables in accounting for the variability in a given principal component are expressed in percentage. The red line indicates the expected average

contribution of each variable. For each axis, a variable with a contribution higher than this threshold was considered as important to the component. The total contribution of a given variable to each axis was calculated using the function *fviz.contrib* of FactoMineR package (Le et al., 2008).

Table S1. PCA statistics from the 17 traits to body size variation between soldiers from unicolonial and multicolonial scapes (Fig. S1A)

	PC1		PC 2		PC3		PC4		PC5	
Eigenvalues	7.9		2.2		1.9		1.4		0.8	
Variance (%)	46.2		13.0		11.4		8.0		4.5	
Cumulative variance (%)	46.2		59.2		70.6		78.7		83.2	
Traits	**Contr.**	**Corr.**	**Contr.**	**Corr.**	**Contr.**	**Corr.**	**Contr.**	**Corr.**	**Contr.**	**Corr.**
RMA	6.83	0.73	12.47	0.53	0.50	-0.10	5.14	-0.26	0.27	-0.05
LMA	6.36	0.71	2.91	0.25	17.35	-0.58	0.70	-0.10	2.16	-0.13
RMP	5.67	0.67	16.74	0.61	1.65	-0.18	3.43	-0.22	0.01	0.01
LMP	5.03	0.63	3.02	0.26	20.45	-0.63	0.23	-0.06	2.73	-0.14
IDR	4.43	0.59	10.80	0.49	0.00	-0.01	13.33	0.43	0.01	0.01
IDL	2.94	0.48	0.61	0.12	1.00	-0.14	22.16	0.55	46.37	0.60
HA	9.58	0.87	9.07	-0.45	0.19	-0.06	1.37	0.14	0.66	-0.07
HP	9.44	0.86	9.58	-0.46	0.23	-0.07	1.05	0.12	0.99	-0.09
HL	8.83	0.83	9.83	-0.47	0.01	-0.02	1.10	0.12	0.73	-0.08
HMxW	7.60	0.77	7.34	-0.40	0.47	-0.10	0.82	0.11	5.64	-0.21
HMnW	4.35	0.58	7.65	-0.41	3.95	-0.28	0.01	-0.01	5.20	0.20
PmL	4.36	0.59	0.04	-0.03	3.62	0.27	14.31	-0.44	18.40	0.38
PmW	4.85	0.62	0.59	-0.11	0.81	0.13	20.35	-0.53	9.11	0.26
PnL	6.46	0.71	0.02	0.02	15.99	0.56	0.06	0.03	0.37	-0.05
PnW	6.67	0.72	0.01	0.01	9.42	0.43	3.50	-0.22	1.09	-0.09
MsL	3.38	0.52	7.46	0.41	8.64	0.41	11.96	0.40	0.02	-0.01
MtL	3.22	0.50	1.85	0.20	15.71	0.55	0.46	0.08	6.25	-0.22

Contr.: trait contribution (%) calculated using the function *fviz.contrib* of FactoMineR package (Le et al., 2008). **Corr**.: correlation coefficient of traits with the principal components.

Table S2. PCA statistics from the 10 most contributing traits to body size variation between soldiers form unicolonial and multicolonial scapes, as selected from the PCA with 17 traits (Fig. S1b)

	PC1		PC 2		PC3		PC4		PC5	
Eigenvalues	5.81		1.90		1.09		0.60		0.23	
Variance (%)	58.1		18.9		10.9		6.0		2.3	
Cumulative variance (%)	58.1		77.0		87.9		93.9		96.2	
	Contr.	**Corr.**	**Contr.**	**Corr.**	**Contr.**	**Corr.**	**Contr.**	**Corr.**	**Contr.**	**Corr.**
RMA	8.80	0.71	20.52	0.62	0.13	-0.04	7.69	-0.21	9.89	-0.15
LMA	8.09	0.69	6.30	0.35	24.03	-0.51	1.64	-0.10	59.69	0.37
HA	13.91	0.90	8.61	-0.40	1.00	-0.10	0.09	0.02	1.31	-0.06
HP	13.64	0.89	9.26	-0.42	1.31	-0.12	0.00	0.01	0.81	-0.04
HL	12.76	0.86	10.03	-0.44	0.59	-0.08	0.04	0.02	0.98	-0.05
HMxW	11.30	0.81	8.53	-0.40	5.12	-0.24	0.00	0.00	2.40	-0.07
PnL	8.84	0.72	0.01	-0.01	37.56	0.64	1.55	0.10	7.48	0.13
PnW	9.46	0.74	0.19	0.06	29.59	0.57	10.60	-0.25	3.84	0.09
RMP	7.25	0.65	26.11	0.70	0.64	-0.08	3.23	-0.14	13.55	-0.18
IDR	5.95	0.59	10.45	0.45	0.04	0.02	75.15	0.67	0.05	-0.01

Contr.: trait contribution (%) calculated using the function *fviz.contrib* of FactoMineR package (Le et al., 2008). **Corr**.: correlation coefficient of traits with the principal components.

2 Fluctuating asymmetry results

Preliminary tests for fluctuating asymmetry analyses in order to assess occurrence of antisymmetry, directional asymmetry, body size dependence and measurement errors of data in four traits of soldiers of *Neotermes chilensis* from unicolonial and multicolonial scapes.

Table S3: Normality distribution test (Kolmogorov-Smirnov with Lilliefors correction), skewness and kurtosis for (R-L) distribution. P-values equal or higher than 0.05 indicate non-significant antisymmetry.

Coloniality	Trait	Skewness	Kurtosis	Normality	
				K-S distribution	p-value
unicolonial	femur length	-0.009	-0.209	0.110	0.413
	femur width	-0.688	0.598	0.141	0.116
	tibia length	0.366	0.228	0.083	0.766
	femur area	0.124	1.265	0.087	0.716
multicolonial	femur length	0.676	0.905	0.155	0.179
	femur width	-0.046	-0.300	0.135	0.352
	tibia length	-0.137	0.004	0.108	0.649
	femur area	0.670	-0.043	0.177	0.072

Table S4: One sample t-test to assess deviations from zero and linear regressions between R-L sides and trait size to discard body size dependence. Two tailed t-test and slope p-values equal or higher than 0.05 indicate non-significant directional asymmetry and body size dependence, respectively. df= degrees of freedom; se= standard error.

Coloniality	Trait	One sample t-test		Linear regression	
		t_{df} value	p-value	slope ± se	p-value
unicolonial	femur length	t_{30}= 1.86	0.072	0.248 ± 0.180	0.178
	femur width	t_{30}= -0.54	0.596	0.179 ± 0.183	0.337
	tibia length	t_{30}= -0.51	0.612	0.073 ± 0.185	0.696
	femur area	t_{30}= 0.84	0.409	-0.165 ± 0.183	0.375
multicolonial	femur length	t_{21}= -0.59	0.562	0.051 ± 0.223	0.821
	femur width	t_{21}= -0.36	0.719	-0.06 ± 0.223	0.790
	tibia length	t_{21}= -0.69	0.500	-0.151 ± 0.221	0.502
	femur area	t_{21}= -0.22	0.827	-0.02 ± 0.224	0.930

Table S5: Two-way ANOVA with soldiers and side (triplicate data for each side) as factors to discard measurement errors. P-values lower than 0.05 in the interaction soldier x side factors indicate non-significant measurement errors.

Coloniality	Trait	Soldiers	Side	Interaction
unicolonial	femur length	$F_{30,185}$= 1786.1 **p< 0.001**	$F_{1,185}$= 66.45 **p< 0.001**	$F_{30,185}$= 19.14 **p< 0.001**
	femur width	$F_{30,185}$= 218.0 **p< 0.001**	$F_{1,185}$= 1.42 p= 0.236	$F_{30,185}$= 4.93 **p< 0.001**
	tibia length	$F_{30,185}$= 1211.1 **p< 0.001**	$F_{1,185}$= 41.71 **p< 0.001**	$F_{30,185}$= 156.6 **p< 0.001**
	femur area	$F_{30,185}$= 208.8 **p< 0.001**	$F_{1,185}$= 3.655 p= 0.058	$F_{30,185}$=5.23 **p< 0.001**
multicolonial	femur length	$F_{21,131}$= 2073.9 **p< 0.001**	$F_{1,131}$= 11.02 **p< 0.001**	$F_{21,131}$= 31.32 **p< 0.001**
	femur width	$F_{21,131}$= 503.2 **p< 0.001**	$F_{1,131}$= 5.903 p= 0.017	$F_{21,131}$= 45.11 **p< 0.001**
	tibia length	$F_{21,131}$= 662.7 **p< 0.001**	$F_{1,131}$= 14.35 **p< 0.001**	$F_{21,131}$= 30.67 **p< 0.001**
	femur area	$F_{21,131}$= 4469.4 **p< 0.001**	$F_{1,131}$= 6.89 **p= 0.010**	$F_{21,131}$= 145.7 **p< 0.001**

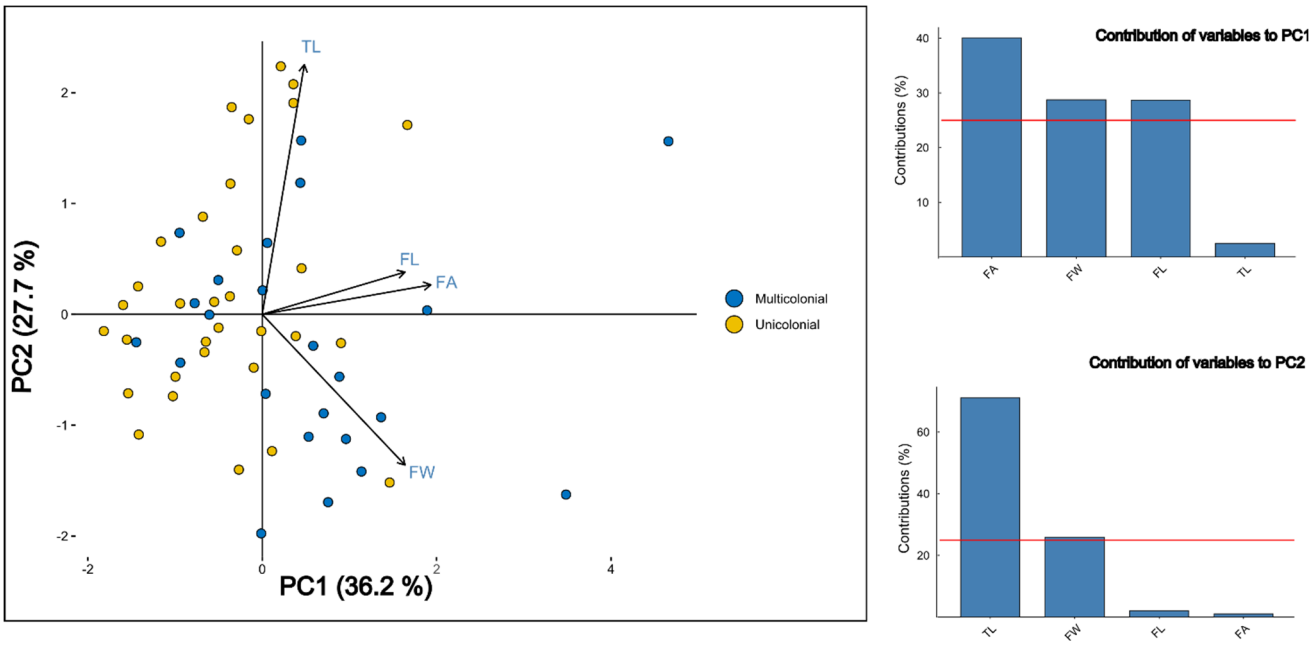

Figure S2: PCA of fluctuating asymmetry index 1 calculated for four traits of *N. chilensis* soldiers from unicolonial (yellow circles) and multicolonial (blue circles) scapes (See Table 1 for variable abbreviations). Bar charts at the right panel show the ten most contributed traits to each principal component. The overall pattern of correlations between metrics showed that variation was concentrated along the first two PCA axis. See legend of Fig. S1 for explanation of variable contribution

Table S6. PCA of fluctuating asymmetry index 1 calculated for four traits of *N. chilensis* soldiers from unicolonial and multicolonial scapes.

	PC1		PC2		PC3		PC4	
Eigenvalues	1.45		1.11		0.81		0.63	
Variance (%)	36.2		27.7		20.3		15.8	
Cumulative variance (%)	36.2		63.9		84.1		100	
	Contr.	**Corr.**	**Contr.**	**Corr.**	**Contr.**	**Corr.**	**Contr.**	**Corr.**
FL	28.7	0.64	2.03	0.15	69.2	0.75	0.09	0.02
FW	28.7	0.65	25.9	0.54	5.5	0.21	39.8	0.50
TL	2.5	0.19	71.1	0.89	5.3	0.21	21.1	0.37
FA	40.1	0.76	1.00	0.10	20.0	0.40	38.9	0.50

Contr.: trait contribution (%) calculated using the function *fviz.contrib* of FactoMineR package (Le et al., 2008). **Corr**.: correlation of traits with the principal components.

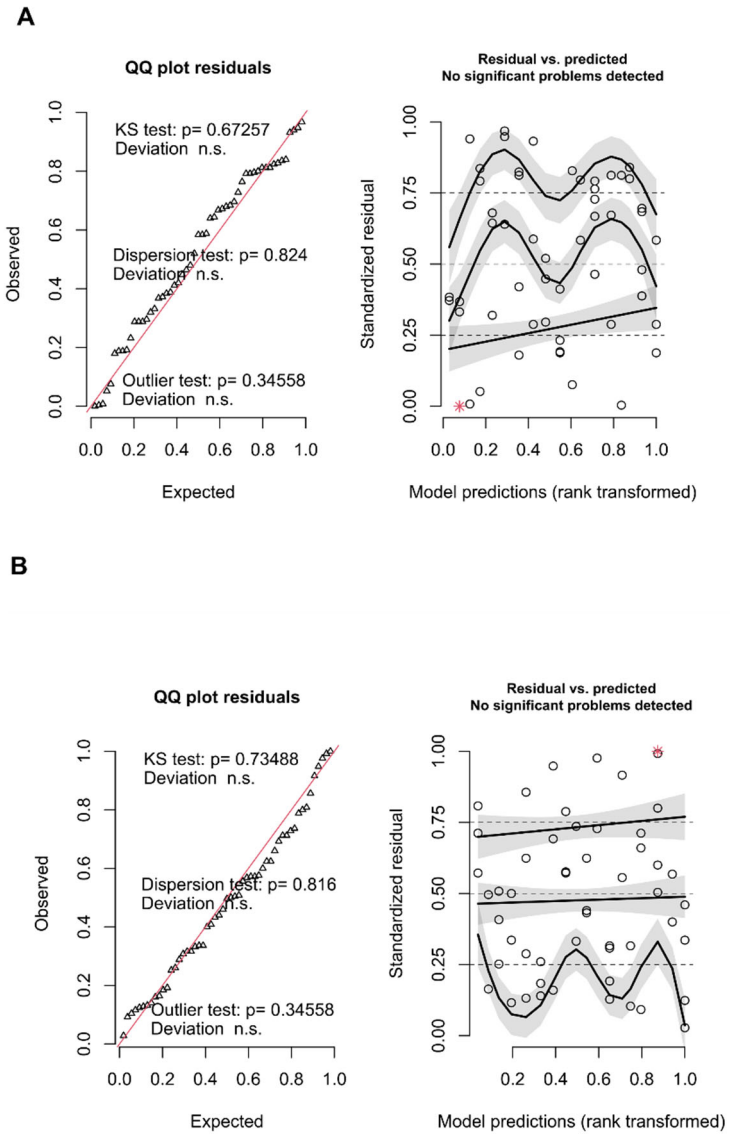

Figure S3: Residual plots from DHARMa package (Hartig 2018) showing the observed fitted model residual values as a function of the expected residual values from GLMMs of (A) PC1 scores for body size measurements and (B) PC1 scores of fluctuating asymmetry variables size measurements. Residual points shown as black points in the QQ plot should align exactly with the red line. In the residuals vs. predicted plot, red lines should align horizontally with black dotted lines.