

Supplementary materials for the manuscript: "Greater mitochondrial energy production provides resistance to ocean acidification in 'winning' hermatypic corals"

Sylvain Agostini¹, Fanny Houlbrèque², Tom Biscéré², Ben P. Harvey¹, Joshua M. Heitzman¹, Risa Takimoto¹, Wataru Yamazaki¹, Marco Milazzo³, Riccardo Rodolfo-Metalpa²

1. Shimoda Marine Research Center, University of Tsukuba, 5-10-1 Shimoda, Japan

2. ENTROPIE, IRD, Université de la Réunion, CNRS, IFREMER, Université de Nouvelle-Calédonie, Nouméa 98800, New Caledonia

3. Dipartimento di Scienze della Terra e del Mare, Università Di Palermo, Palermo, Italy

Table 1: Data set used to test hypothesis (1) Inherent physiological traits of coral species resistant to ocean acidification: Physiological traits of corals in control areas. Data presented as mean \pm SE.

Location	Species	Resistance	n	Protein	ETSA	ETSA
				$\mu\text{g cm}^{-2}$	$\mu\text{g O}_2 \text{ h}^{-1} \text{ cm}^{-2}$	$\text{mg O}_2 \text{ h}^{-1} \text{ mg}^{-1} \text{ prot.}$
Normanby	<i>Acropora florida</i>	losing	3	67 \pm 8	14.2 \pm 1.3	0.21 \pm 0.01
Normanby	<i>Acropora millepora</i>	losing	4	190 \pm 49	14.3 \pm 3.7	0.08 \pm 0.02
Normanby	<i>Acropora tenuis</i>	losing	3	134 \pm 9	16.5 \pm 2	0.12 \pm 0.01
Normanby	<i>Pocillopora acuta</i>	winning	3	32 \pm 9	5.7 \pm 0.2	0.2 \pm 0.05
Normanby	<i>Porites</i> sp.	winning	3	11 \pm 1	15.6 \pm 4.2	1.5 \pm 0.46
Shikine	<i>Acropora cf. glauca</i>	losing	5	243 \pm 44	20.9 \pm 1	0.1 \pm 0.02
Shikine	<i>Acropora solitaryensis</i>	losing	11	180 \pm 33	12.5 \pm 1.7	0.09 \pm 0.02
Shikine	<i>Dipsastraea speciosa</i>	winning	4	45 \pm 11	7.2 \pm 1.3	0.17 \pm 0.02
Shikine	<i>Porites heronensis</i>	winning	11	112 \pm 23	14.1 \pm 1.4	0.34 \pm 0.17
Mean values for losing species			26	175 \pm 20	15 \pm 1.1	0.11 \pm 0.01
Mean values for winning species			21	73 \pm 15	11.8 \pm 1.2	0.46 \pm 0.14

Table 2: Summaries of statistics for Hypothesis (1) Inherent physiological traits of coral species resistant to ocean acidification: Physiological traits of corals in control areas

2.1 Protein

Generalized linear mixed model fit by maximum likelihood (Laplace Approximation)

Family: Gamma (identity)

Formula: protein ~ resistance + (resistance | Location)

AIC	BIC	logLik	Deviance	Df residuals
536	547.1	-262.0	524.0	41

Scaled residuals:

Min	1Q	Median	3Q	Max
-1.3089	-0.7435	-0.1453	0.3547	2.6924

Random effects:

Groups	Name	Variance	Std. Dev.	Corr
Species	(Intercept)	538.276	23.2008	
	Resistance	7.444	2.7284	1.00
Residual		0.443	0.6656	

Number of obs: 47, groups: Location, 2

Fixed effects:

Groups	Estimate	Std. Error	t value	Pr(> z)
(Intercept)	171.08	31.05	5.510	3.59 10 ⁻⁸ ***
Resistance	-110.74	22.29	-4.967	6.79 10 ⁻⁷ ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intercept)
Resistance	-0.512

2.2 Surface area-specific ETSA

Generalized linear mixed model fit by maximum likelihood (Laplace Approximation)

Family: Gamma (identity)

Formula: ETSA.surf ~ resistance + (resistance | Location)

AIC	BIC	logLik	Deviance	Df residuals
307.4	318.5	-147.7	295.4	41

Scaled residuals:

Min	1Q	Median	3Q	Max
-1.7037	-0.8068	-0.1372	0.8578	2.3463

Random effects:

Groups	Name	Variance	Std. Dev.	Corr
Species	(Intercept)	0	0	
	Resistance	1.766 10 ⁻¹⁶	1.329 10 ⁻⁸	NaN
Residual		1.736 10 ⁻¹	4.167 10 ⁻¹	

Number of obs: 47, groups: Location, 2

Fixed effects:

Groups	Estimate	Std. Error	t value	Pr(> z)
(Intercept)	15.033	1.282	11.726	<2 10 ⁻¹⁶ ***
Resistance	-3.266	1.700	-1.921	0.0547 .

Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intercept)
Resistance	-0.754

2.3 Biomass-specific ETSA

Generalized linear mixed model fit by maximum likelihood (Laplace Approximation)

Family: Gamma (identity)

Formula: ETSA.prot ~ resistance + (resistance | Location)

AIC	BIC	logLik	Deviance	Df residuals
-46.6	-35.5	29.3	-58.6	41

Scaled residuals:

Min	1Q	Median	3Q	Max
-0.8085	-0.5778	-0.4381	0.3390	4.3668

Random effects:

Groups	Name	Variance	Std. Dev.	Corr
Species	(Intercept)	0	0	
	Resistance	0.05815	0.2411	NaN
Residual		1.03077	1.0153	

Number of obs: 47, groups: Location, 2

Fixed effects:

Groups	Estimate	Std. Error	t value	Pr(> z)
(Intercept)	0.10779	0.01679	6.421	1.35 10 ⁻¹⁰ ***
Resistance	0.41589	0.20394	2.039	0.0414 *

Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intercept)
Resistance	-0.082

Table 3: Data set used to test Hypothesis (2) Physiological plasticity as an acclimation response to ocean acidification: Physiological Traits of corals transplanted from control areas into control and elevated $p\text{CO}_2$ areas (Mean \pm SE (n)).

Location	Species	Resistance	Protein $\mu\text{g cm}^{-2}$		ETSA $\mu\text{g O}_2 \text{ h}^{-1} \text{ cm}^{-2}$		ETSA $\text{mg O}_2 \text{ h}^{-1} \text{ mg}^{-1} \text{ protein}$	
			control	seep	control	seep	control	seep
Normanby	<i>Acropora millepora</i>	losing	190 \pm 49 (3)	82 \pm 14 (3)	14.3 \pm 3.7 (3)	4.5 \pm 0.5 (3)	0.08 \pm 0.03 (3)	0.06 \pm 0.01 (3)
Normanby	<i>Acropora tenuis</i>	losing	134 \pm 9 (3)	69 \pm 37 (3)	16.5 \pm 2 (3)	11.6 \pm 5 (3)	0.12 \pm 0.01 (3)	0.37 \pm 0.19 (3)
Normanby	<i>Acropora florida</i>	losing	67 \pm 8 (3)	44 \pm 7 (3)	14.2 \pm 1.3 (3)	16.9 \pm 1.6 (3)	0.21 \pm 0.01 (3)	0.42 \pm 0.11 (3)
Normanby	<i>Pocillopora acuta</i>	winning	32 \pm 9 (3)	35 \pm 1 (2)	5.7 \pm 0.2 (3)	8.7 \pm 0.6 (2)	0.2 \pm 0.05 (3)	0.25 \pm 0.03 (2)
Shikine	<i>Acropora solitaryensis</i>	losing	164 \pm 18 (6)	120 \pm 19 (6)	7.7 \pm 0.9 (6)	10.7 \pm 2.8 (6)	0.06 \pm 0.01 (6)	0.07 \pm 0.01 (6)
Shikine	<i>Porites heronensis</i>	winning	115 \pm 14 (6)	107 \pm 13 (6)	12.3 \pm 1.5 (6)	9.4 \pm 1.4 (6)	0.11 \pm 0.01 (6)	0.1 \pm 0.03 (6)
Mean values for losing species			147 \pm 17 (16)	87 \pm 13 (15)	13.3 \pm 1.4 (16)	9.6 \pm 1.5 (15)	0.11 \pm 0.02 (16)	0.2 \pm 0.06 (15)
Mean values for winning species			87 \pm 17 (9)	89 \pm 15 (8)	10.1 \pm 1.5 (9)	9.2 \pm 1.1 (8)	0.14 \pm 0.02 (9)	0.14 \pm 0.03 (8)

Table 4: Statistic summaries for Hypothesis (2) Physiological plasticity as an acclimation response to ocean acidification: Physiological Traits of corals transplanted from control areas into control and elevated $p\text{CO}_2$ areas

4.1 Protein contents

Generalized linear mixed model fit by maximum likelihood (Laplace Approximation)

Family: Gamma (identity)

Formula: protein ~ CO2_condition * resistance + (CO2_condition | species)

AIC	BIC	logLik	Deviance	Df residuals
500.2	$\frac{515.}{2}$	-242.1	484.2	40

Scaled residuals:

Min	1Q	Median	3Q	Max
-1.89297	-0.62218	-0.07214	0.42543	2.83022

Random effects:

Groups	Name	Variance	Std. Dev.	Corr
Species	(Intercept)	791.855 1	28.1399	
	CO ₂ condition	60.6309	7.7866	-1.00
Residual		0.1634	0.4042	

Number of obs: 48, groups: species, 6

Fixed effects:

Groups	Estimate	Std. Error	t value	Pr(> z)
(Intercept)	138.44	25.18	5.497	$3.85 \cdot 10^{-8}$ ***
CO ₂ condition	-52.75	15.17	-3.477	0.000507 ***
Resistance	-52.44	46.02	-1.140	0.254461
CO ₂ condition : Resistance	43.87	21.25	2.064	0.038996 *

Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intercept)	CO ₂ condition	Resistance
CO ₂ condition	-0.701		
Resistance	-0.519	0.344	
CO ₂ condition : Resistance	0.458	-0.616	-0.732

4.2 Surface area-specific ETSA

Generalized linear mixed model fit by maximum likelihood (Laplace Approximation)

Family: Gamma (identity)

Formula: ETSA ~ CO2_condition * resistance + (CO2_condition | species)

AIC	BIC	logLik	Deviance	Df residuals
291.0	305.9	-137.5	275.0	40

Scaled residuals:

Min	1Q	Median	3Q	Max
-1.9288	-0.5229	-0.2065	0.5123	2.3420

Random effects:

Groups	Name	Variance	Std. Dev.	Corr
Species	(Intercept)	4.2472	2.0609	
	CO ₂ condition	8.2941	2.8800	-0.52
Residual		0.1575	0.3968	

Number of obs: 48, groups: species, 6

Fixed effects:

Groups	Estimate	Std. Error	t value	Pr(> z)
(Intercept)	13.95835	0.00521	2679.2	<2e-16 ***
CO ₂ condition	-3.81830	0.00521	-732.9	<2e-16 ***
Resistance	-4.94409	0.00521	-948.9	<2e-16 ***
CO ₂ condition : Resistance	4.22512	0.00521	811.0	<2e-16 ***

Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intercept)	CO ₂ condition	Resistance
CO ₂ condition	0.00		
Resistance	0.00	0.00	
CO ₂ condition : Resistance	0.00	0.00	0.00

4.3 Biomass-specific ETSA

Generalized linear mixed model fit by maximum likelihood (Laplace Approximation)

Family: Gamma (identity)

Formula: ETSA.prot ~ CO2_condition * resistance + (CO2_condition | species)

AIC	BIC	logLik	Deviance	Df residuals
-118.6	103.7	67.3	-134.6	40

Scaled residuals:

Min	1Q	Median	3Q	Max
-1.8855	-0.4881	-0.2148	0.3512	2.695

Random effects:

Groups	Name	Variance	Std. Dev.	Corr
Species	(Intercept)	0.00099 5	0.03154	
	CO ₂ condition	0.00330 6	0.05749	1.00
Residual		0.24755 7	0.49755	

Number of obs: 48, groups: species, 6

Fixed effects:

Groups	Estimate	Std. Error	t value	Pr(> z)
(Intercept)	0.13502	0.03307	4.083	4.44 10 ⁻⁵ ***
CO ₂ condition	0.11448	0.06553	1.747	0.0806 .
Resistance	0.02069	0.05270	0.393	0.6946
CO ₂ condition : Resistance	-0.05556	0.09693	-0.573	0.5665

Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intercept)	CO ₂ condition	Resistance
CO ₂ condition	0.464		
Resistance	-0.565	-0.344	
CO ₂ condition : Resistance	-0.368	0.555	0.723

Table 5: Data set used to test Hypothesis (3) Selection or acquisition of resistance to ocean acidification: Physiological traits of corals found naturally in both elevated $p\text{CO}_2$ and control areas (mean \pm SE (n)).

Location	Species	Resistance	Protein		ETSA		ETSA	
			$\mu\text{g cm}^{-2}$		$\mu\text{g O}_2 \text{ h}^{-1} \text{ cm}^{-2}$		$\text{mg O}_2 \text{ h}^{-1} \text{ mg}^{-1} \text{ prot.}$	
			control	seep	control	seep	control	seep
Normanby	<i>Acropora millepora</i>	losing	190 \pm 49 (4)	69 \pm 9 (3)	14.3 \pm 3.7 (4)	3.0 \pm 1.3 (3)	0.08 \pm 0.03 (4)	0.05 \pm 0.02 (3)
Normanby	<i>Pocillopora acuta</i>	winning	32 \pm 9 (3)	32 \pm 16 (3)	5.7 \pm 0.2 (3)	14.4 \pm 3.1 (3)	0.2 \pm 0.05 (3)	1.01 \pm 0.61 (3)
Normanby	<i>Porites</i> sp.	winning	11 \pm 1 (3)	53 \pm 19 (3)	15.6 \pm 4.2 (3)	9.5 \pm 2.2 (3)	1.5 \pm 0.46 (3)	0.24 \pm 0.11 (3)
Shikine	<i>Acropora solitaryensis</i>	losing	180 \pm 33 (11)	112 \pm 3 (2)	12.5 \pm 1.7 (11)	22.6 \pm 4.7 (2)	0.09 \pm 0.02 (11)	0.20 \pm 0.04 (2)
Shikine	<i>Dipsastraea speciosa</i>	winning	45 \pm 11 (4)	68 \pm 21 (6)	7.2 \pm 1.3 (4)	16.6 \pm 3.1 (6)	0.17 \pm 0.02 (4)	0.58 \pm 0.3 (6)
Shikine	<i>Porites heronensis</i>	winning	112 \pm 23 (11)	97 \pm 12 (5)	14.1 \pm 1.4 (11)	13.5 \pm 0.8 (5)	0.34 \pm 0.17 (11)	0.15 \pm 0.02 (5)
Mean values for losing species			183 \pm 26 (15)	86 \pm 12 (5)	13 \pm 1.5 (15)	10.9 \pm 5.1 (5)	0.09 \pm 0.01 (15)	0.11 \pm 0.04 (5)
Mean values for winning species			73 \pm 15 (21)	67 \pm 10 (17)	11.8 \pm 1.2 (21)	14.1 \pm 1.3 (17)	0.46 \pm 0.14 (21)	0.47 \pm 0.16 (17)

Table 6: Statistic summaries for Hypothesis (3) Selection or acquisition of resistance to ocean acidification: Physiological traits of corals found naturally in both elevated $p\text{CO}_2$ and control areas

6.1 Protein contents

Generalized linear mixed model fit by maximum likelihood (Laplace Approximation)

Family: Gamma (identity)

Formula: protein ~ CO2_condition * resistance + (CO2_condition | species)

AIC	BIC	logLik	Deviance	Df residuals
634.5	651.0	-309.3	618.5	50

Scaled residuals:

Min	1Q	Median	3Q	Max
-1.53772	0.62832	-0.08188	0.43875	2.62239

Random effects:

Groups	Name	Variance	Std. Dev.	Corr
Species	(Intercept)	507.14	22.5198	
	CO ₂ condition	130.51	11.4242	-1.00
Residual		0.38	0.6165	

Number of obs: 58, groups: species, 6

Fixed effects:

Groups	Estimate	Std. Error	t value	Pr(> z)	
(Intercept)	183.61	38.90	4.720	2.36 10 ⁻⁶	***
CO ₂ condition	-96.82	42.10	-2.300	0.0215	*
Resistance	-130.92	43.47	-3.012	0.0026	**
CO ₂ condition : Resistance	109.09	44.81	2.435	0.0149	*

Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intercept)	CO ₂ condition	Resistance
CO ₂ condition	-0.790		
Resistance	-0.903	0.714	
CO ₂ condition : Resistance	0.744	-0.941	-0.779

6.2 Surface area-specific ETSA

Generalized linear mixed model fit by maximum likelihood (Laplace Approximation)

Family: Gamma (identity)

Formula: ETSA ~ CO2_condition * resistance + (CO2_condition | species)

AIC	BIC	logLik	Deviance	Df residuals
383.0	399.5	-183.5	367.0	50

Scaled residuals:

Min	1Q	Median	3Q	Max
-1.91097	-0.78755	0.07454	0.48024	2.10491

Random effects:

Groups	Name	Variance	Std. Dev.	Corr
Species	(Intercept)	0.000	0.000	
	CO ₂ condition	12.2006	3.4929	NaN
Residual		0.2157	0.4644	

Number of obs: 58, groups: species, 6

Fixed effects:

Groups	Estimate	Std. Error	t value	Pr(> z)
(Intercept)	12.9591	1.5677	8.266	<2 10 ⁻¹⁶ ***
CO ₂ condition	-0.8117	5.5451	-0.146	0.884
Resistance	-1.1924	1.9761	-0.603	0.546
CO ₂ condition : Resistance	3.1101	6.3084	0.493	0.622

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intercept)	CO ₂ condition	Resistance
CO ₂ condition	-0.282		
Resistance	-0.793	0.224	
CO ₂ condition : Resistance	0.248	-0.848	-0.313

6.3 Biomass-specific ETSA

Generalized linear mixed model fit by maximum likelihood (Laplace Approximation)

Family: Gamma (identity)

Formula: ETSA.prot ~ CO2_condition * resistance + (CO2_condition | species)

AIC	BIC	logLik	Deviance	Df residuals
-20.4	-3.9	18.2	-36.4	50

Scaled residuals:

Min	1Q	Median	3Q	Max
-0.8015	-0.5784	-0.3340	0.1459	3.6818

Random effects:

Groups	Name	Variance	Std. Dev.	Corr
Species	(Intercept)	9.462 10 ⁻⁵	0.00973	
	CO ₂ condition	2.949 10 ⁻²	0.17171	-1.00
Residual		1.288	1.1350	

Number of obs: 58, groups: species, 6

Fixed effects:

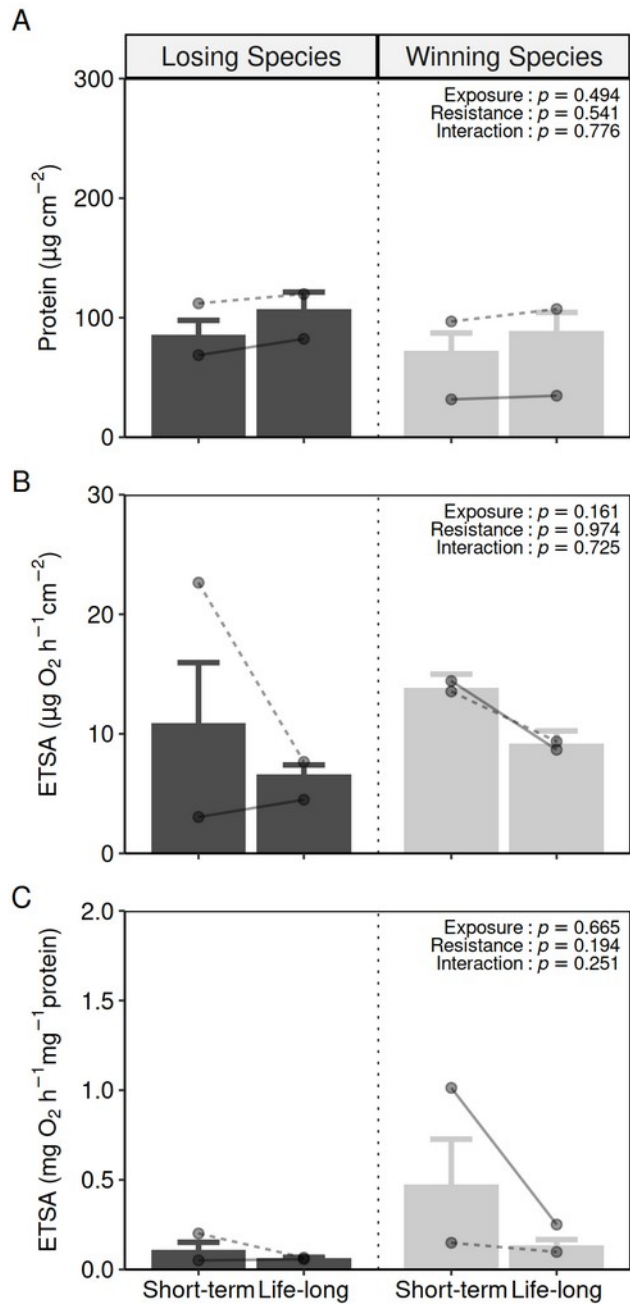
Groups	Estimate	Std. Error	t value	Pr(> z)
(Intercept)	0.08834	0.02398	3.684	0.000230 ***
CO ₂ condition	0.04729	0.12414	0.381	0.703245
Resistance	0.36120	0.10265	3.519	0.000433 ***
CO ₂ condition : Resistance	-0.09075	0.19182	-0.473	0.636145

Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intercept)	CO ₂ condition	Resistance
CO ₂ condition	-0.426		
Resistance	-0.424	0.166	
CO ₂ condition : Resistance	0.354	-0.655	-0.581

Figure 1:



Mean (\pm SE) protein per surface (A), ETSA per coral surface area (B) and ETSA per protein contents (C) in losing species (black bars) and winning species (grey bars) species transplanted from the control areas to elevated $p\text{CO}_2$ areas (short-term) and naturally found in the elevated $p\text{CO}_2$ areas (Life-long) (losing species specimens: short-term $n = 15$, life-long $n = 5$; winning specimens: long-term = 8, life-long = 17). Points and lines show the mean and response per species with dashed and plain lines representing species from Shikine and Normanby sites, respectively

(see Supplementary Table 5). Two-way GLMM (CO₂ condition x resistance with Species as a random factor) results are presented in the top-right of each panel (see Supplementary Table 7 for more detailed statistics).

Table 7: Summaries of statistics for differences in traits of corals transplanted (Hypothesis 2) and naturally found (Hypothesis 3) in the control and elevated $p\text{CO}_2$ areas

7.1 Protein contents

Generalized linear mixed model fit by maximum likelihood (Laplace Approximation)

Family: Gamma (identity)

Formula: protein ~ exposure_duration * resistance + (exposure_duration | species)

AIC	BIC	logLik	Deviance	Df residuals
316.0	$\frac{327.}{2}$	-150.0	300.0	22

Scaled residuals:

Min	1Q	Median	3Q	Max
-2.3639	-0.4373	-0.1876	0.4854	2.1507

Random effects:

Groups	Name	Variance	Std. Dev.	Corr
Species	(Intercept)	270.51	16.4472	
	Exposure Condition	2.224	1.4911	1.00
Residual		0.143	0.3782	

Number of obs: 30, groups: species, 4

Fixed effects:

Groups	Estimate	Std. Error	t value	Pr(> z)
(Intercept)	89.310	24.934	3.582	0.0003 ***
Exposure Condition	14.176	20.708	0.685	0.4936
Resistance	-21.128	34.601	-0.611	0.5414
Exposure Condition : Resistance	-6.935	24.328	-0.285	0.7756

Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intercept)	Exposure Condition	Resistance
Exposure Condition	-0.372		
Resistance	-0.683	0.239	
Exposure Condition : Resistance	0.284	-0.810	-0.240

7.2 Surface area-specific ETSA

Generalized linear mixed model fit by maximum likelihood (Laplace Approximation)

Family: Gamma (identity)

Formula: ETSA ~ exposure_duration * resistance + (exposure_duration | species)

AIC	BIC	logLik	Deviance	Df residuals
180.1	191.3	-82.0	164.1	22

Scaled residuals:

Min	1Q	Median	3Q	Max
-2.33894	-0.36656	0.02817	0.59309	1.76159

Random effects:

Groups	Name	Variance	Std. Dev.	Corr
Species	(Intercept)	12.8171	3.5801	
	Exposure Condition	8.5086	2.9169	-1.00
Residual		0.1418	0.3766	

Number of obs: 30, groups: species, 4

Fixed effects:

Groups	Estimate	Std. Error	t value	Pr(> z)
(Intercept)	14.3978	6.2273	2.312	0.0208 *
Exposure Condition	-7.7444	5.5314	-1.400	0.1615
Resistance	0.2556	7.7110	0.033	0.9736
Exposure Condition : Resistance	2.3986	6.8056	0.352	0.7245

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intercept)	Exposure Condition	Resistance
Exposure Condition	-0.984		
Resistance	-0.783	0.768	
Exposure Condition : Resistance	0.773	-0.783	-0.972

7.3 Biomass-specific ETSA.prot

Generalized linear mixed model fit by maximum likelihood (Laplace Approximation)

Family: Gamma (identity)

Formula: ETSA.prot ~ exposure_duration * resistance + (exposure_duration | species)

AIC	BIC	logLik	Deviance	Df residuals
-55.4	-44.2	35.7	-71.4	22

Scaled residuals:

Min	1Q	Median	3Q	Max
-1.5447	0.5052	-0.0908	0.3080	3.2529

Random effects:

Groups	Name	Variance	Std. Dev.	Corr
Species	(Intercept)	0.03598	0.1897	
	Exposure Condition	0.02602	0.1613	-1.00
Residual		0.34355	0.5861	

Number of obs: 30, groups: species, 4

Fixed effects:

Groups	Estimate	Std. Error	t value	Pr(> z)
(Intercept)	0.14823	0.22457	0.660	0.509
Exposure Condition	-0.08325	0.19239	-0.433	0.665
Resistance	0.43284	0.33303	1.300	0.194
Exposure Condition: Resistance	-0.33277	0.28988	-1.148	0.251

Signif. Codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:

	(Intercept)	Exposure Condition	Resistance
Exposure Condition	-0.998		
Resistance	-0.659	0.654	
Exposure Condition : Resistance	0.638	-0.633	-0.992