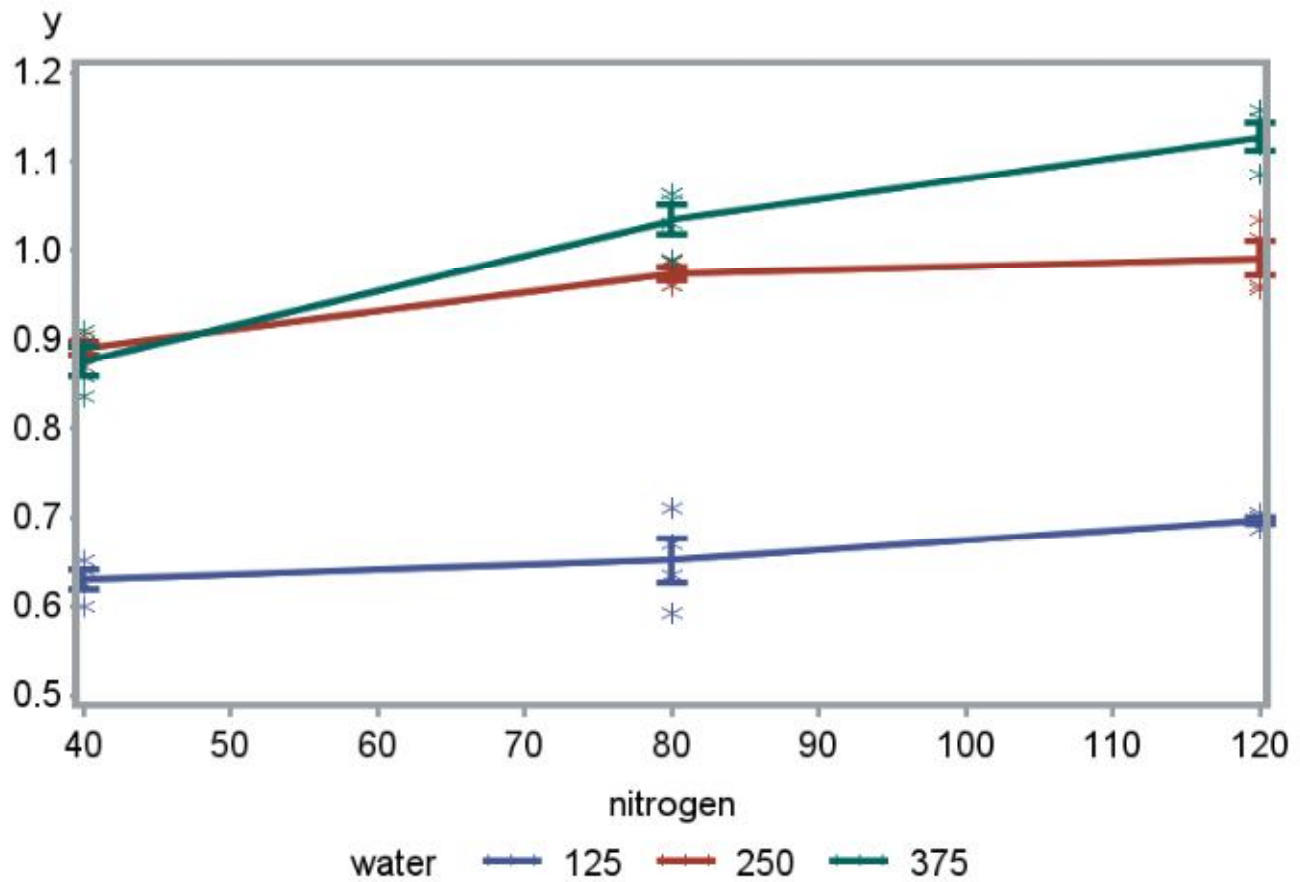


Two-way ANOVA for biomass
Data from Maestre and Reynolds (2007)

Obs	nitrogen	water	biomass	y
1	40	125	4.372	0.64068
2	40	125	4.482	0.65147
3	40	125	4.221	0.62542
4	40	125	3.977	0.59956
5	40	250	7.400	0.86923
6	40	250	8.027	0.90455
7	40	250	7.883	0.89669
8	40	250	7.769	0.89037
9	40	375	7.226	0.85890
10	40	375	8.126	0.90988
11	40	375	6.840	0.83506
12	40	375	7.901	0.89768
13	80	125	5.140	0.71096
14	80	125	3.913	0.59251
15	80	125	4.669	0.66922
16	80	125	4.306	0.63407
17	80	250	9.099	0.95899
18	80	250	9.711	0.98726
19	80	250	9.123	0.96014
20	80	250	9.709	0.98717
21	80	375	10.701	1.02942
22	80	375	11.552	1.06266
23	80	375	11.356	1.05523
24	80	375	9.759	0.98941
25	120	125	5.021	0.70079
26	120	125	4.970	0.69636
27	120	125	5.055	0.70372
28	120	125	4.862	0.68681
29	120	250	9.029	0.95564
30	120	250	10.791	1.03306
31	120	250	9.115	0.95976
32	120	250	10.319	1.01364
33	120	375	12.189	1.08597
34	120	375	14.381	1.15779
35	120	375	13.153	1.11902
36	120	375	14.066	1.14817

Two-way ANOVA for biomass
Data from Maestre and Reynolds (2007)



Two-way ANOVA for biomass
Data from Maestre and Reynolds (2007)
MODEL WITH INTERACTION - USE THIS OUTPUT IF INTERACTION SIGNIFICANT

The GLM Procedure

Class Level Information		
Class	Levels	Values
nitrogen	3	40 80 120
water	3	125 250 375

Number of Observations Read	36
Number of Observations Used	36

Two-way ANOVA for biomass
Data from Maestre and Reynolds (2007)
MODEL WITH INTERACTION - USE THIS OUTPUT IF INTERACTION SIGNIFICANT

The GLM Procedure

Dependent Variable: y

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	8	1.01770131	0.12721266	135.84	<.0001
Error	27	0.02528594	0.00093652		
Corrected Total	35	1.04298725			

R-Square	Coeff Var	Root MSE	y Mean
0.975756	3.499961	0.030603	0.874368

Source	DF	Type II SS	Mean Square	F Value	Pr > F
nitrogen	2	0.12039036	0.06019518	64.28	<.0001
water	2	0.85496135	0.42748068	456.46	<.0001
nitrogen*water	4	0.04234959	0.01058740	11.31	<.0001

Two-way ANOVA for biomass
Data from Maestre and Reynolds (2007)
MODEL WITH INTERACTION - USE THIS OUTPUT IF INTERACTION SIGNIFICANT

The GLM Procedure
Least Squares Means

nitrogen	water	y LSMEAN
40	125	0.62928074
40	250	0.89021041
40	375	0.87537823
80	125	0.65169272
80	250	0.97339245
80	375	1.03417806
120	125	0.69692068
120	250	0.99052391
120	375	1.12773815

Two-way ANOVA for biomass
Data from Maestre and Reynolds (2007)
MODEL WITH INTERACTION - USE THIS OUTPUT IF INTERACTION SIGNIFICANT

The GLM Procedure
Least Squares Means

nitrogen*water Effect Sliced by water for y					
water	DF	Sum of Squares	Mean Square	F Value	Pr > F
125	2	0.009497	0.004749	5.07	0.0135
250	2	0.023034	0.011517	12.30	0.0002
375	2	0.130209	0.065104	69.52	<.0001

Two-way ANOVA for biomass
Data from Maestre and Reynolds (2007)
MODEL WITH INTERACTION - USE THIS OUTPUT IF INTERACTION SIGNIFICANT

The GLM Procedure
Least Squares Means

nitrogen*water Effect Sliced by nitrogen for y					
nitrogen	DF	Sum of Squares	Mean Square	F Value	Pr > F
40	2	0.171824	0.085912	91.74	<.0001
80	2	0.337974	0.168987	180.44	<.0001
120	2	0.387512	0.193756	206.89	<.0001

Two-way ANOVA for biomass
Data from Maestre and Reynolds (2007)
MODEL WITHOUT INTERACTION - USE THIS OUTPUT IF INTERACTION NS

The GLM Procedure

Class Level Information		
Class	Levels	Values
nitrogen	3	40 80 120
water	3	125 250 375

Number of Observations Read	36
Number of Observations Used	36

Two-way ANOVA for biomass
Data from Maestre and Reynolds (2007)
MODEL WITHOUT INTERACTION - USE THIS OUTPUT IF INTERACTION NS

The GLM Procedure

Dependent Variable: y

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	4	0.97535171	0.24383793	111.76	<.0001
Error	31	0.06763553	0.00218179		
Corrected Total	35	1.04298725			

R-Square	Coeff Var	Root MSE	y Mean
0.935152	5.342102	0.046710	0.874368

Source	DF	Type II SS	Mean Square	F Value	Pr > F
nitrogen	2	0.12039036	0.06019518	27.59	<.0001
water	2	0.85496135	0.42748068	195.93	<.0001

Two-way ANOVA for biomass
Data from Maestre and Reynolds (2007)
MODEL WITHOUT INTERACTION - USE THIS OUTPUT IF INTERACTION NS

The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey

nitrogen	y LSMEAN	LSMEAN Number
40	0.79828979	1
80	0.88642108	2
120	0.93839425	3

Least Squares Means for effect nitrogen Pr > t for H0: LSMean(i)=LSMean(j) Dependent Variable: y			
i/j	1	2	3
1		0.0002	<.0001
2	0.0002		0.0275
3	<.0001	0.0275	

nitrogen	y LSMEAN	95% Confidence Limits	
40	0.798290	0.770789	0.825790
80	0.886421	0.858920	0.913922
120	0.938394	0.910894	0.965895

Least Squares Means for Effect nitrogen				
i	j	Difference Between Means	Simultaneous 95% Confidence Limits for LSMean(i)-LSMean(j)	
1	2	-0.088131	-0.135063	-0.041199
1	3	-0.140104	-0.187037	-0.093172
2	3	-0.051973	-0.098905	-0.005041

Tukey Comparison Lines for Least Squares Means of nitrogen			
LS-means with the same letter are not significantly different.			
	y LSMEAN	nitrogen	LSMEAN Number
A	0.93839425	120	3
B	0.88642108	80	2
C	0.79828979	40	1

Two-way ANOVA for biomass
Data from Maestre and Reynolds (2007)
MODEL WITHOUT INTERACTION - USE THIS OUTPUT IF INTERACTION NS

The GLM Procedure
Least Squares Means
Adjustment for Multiple Comparisons: Tukey

water	y LSMEAN	LSMEAN Number
125	0.65929804	1
250	0.95137559	2
375	1.01243148	3

Least Squares Means for effect water
Pr > |t| for H0: LSMean(i)=LSMean(j)
Dependent Variable: y

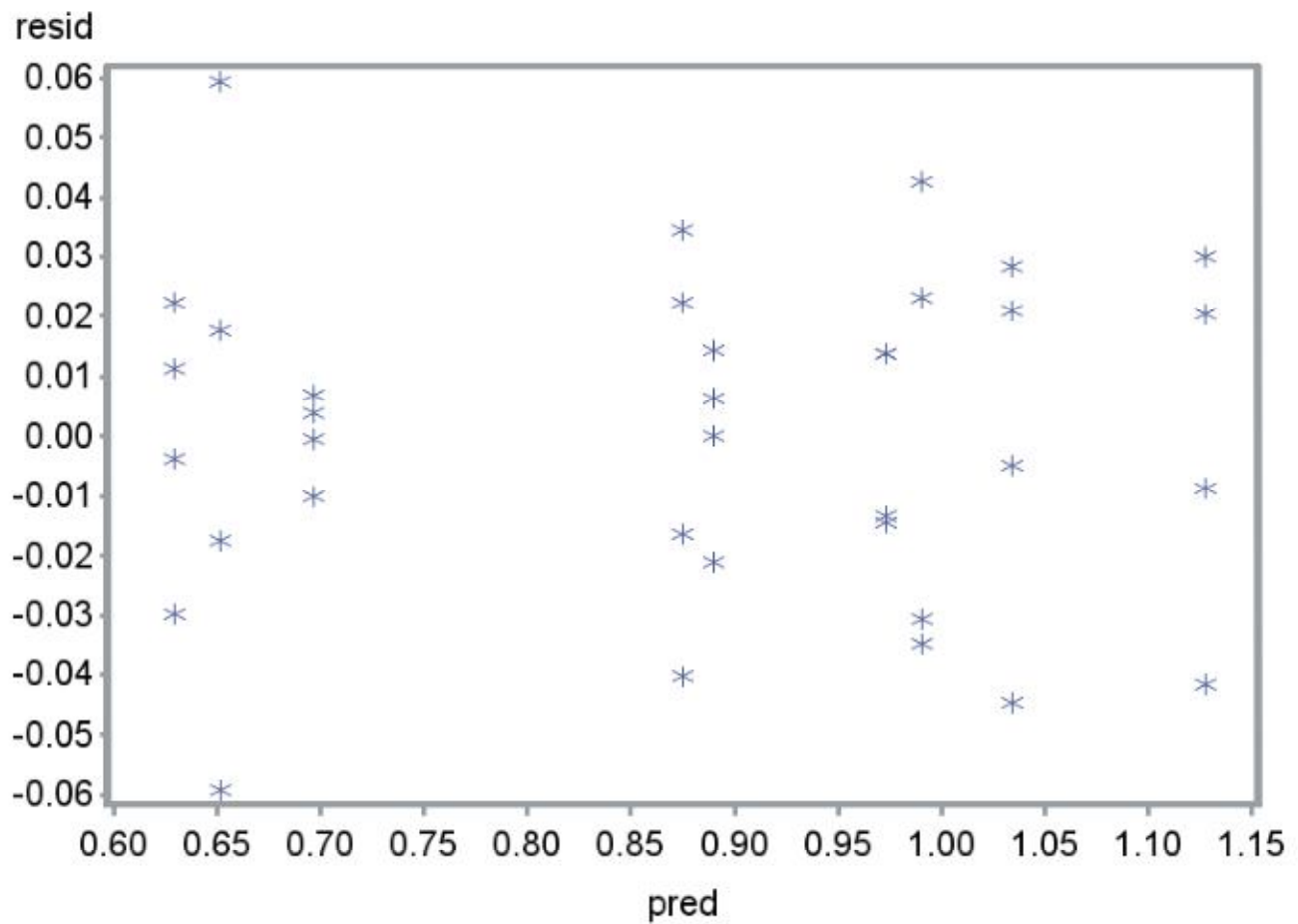
i/j	1	2	3
1		<.0001	<.0001
2	<.0001		0.0086
3	<.0001	0.0086	

water	y LSMEAN	95% Confidence Limits	
125	0.659298	0.631797	0.686799
250	0.951376	0.923875	0.978876
375	1.012431	0.984931	1.039932

Least Squares Means for Effect water				
i	j	Difference Between Means	Simultaneous 95% Confidence Limits for LSMean(i)-LSMean(j)	
1	2	-0.292078	-0.339010	-0.245145
1	3	-0.353133	-0.400066	-0.306201
2	3	-0.061056	-0.107988	-0.014124

Tukey Comparison Lines for Least Squares Means of water

LS-means with the same letter are not significantly different.			
	y LSMEAN	water	LSMEAN Number
A	1.01243148	375	3
B	0.95137559	250	2
C	0.65929804	125	1

Diagnostic plots to check anova assumptions

The UNIVARIATE Procedure

Diagnostic plots to check anova assumptions

