Appendix 2 – Statistical outputs from Chapter 3

3-Way ANOVA

Species abundance data (4th Root transformed)

Species presence/absence data (4th root transformed)

Order abundance data (4th root transformed)

Phylum abundance data (4th root transformed)

All feeding guilds, abundance data (4th root transformed)

Predator abundance data (4th root transformed)

Deposit feeder abundance data (4th root transformed)

Appendix 2 – Statistical outputs from Chapter 3

3-Way ANOVA table for Region A total abundance (Table 3.5)

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Condition*Season	1	87468	87468	87468	0.47	0.512
Condition*Year	1	189	189	189	0.00	0.975
Season*Year	1	43577	43577	43577	0.23	0.641
Condition*Season*Year	1	542801	542801	542801	2.92	0.126
Condition	1	773960	773960	773960	4.16	0.076
Season	1	20093	20093	20093	0.11	0.751
Year	1	2630073	2630073	2630073	14.13	0.006
Error	8	1488936	1488936	186117		
Total	15	5587097				

3-Way ANOVA table for Region B total abundance (Table 3.5)

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Condition*Season	1	87468	87468	87468	0.47	0.512
Condition*Year	1	189	189	189	0.00	0.975
Season*Year	1	43577	43577	43577	0.23	0.641
Condition*Season*Year	1	542801	542801	542801	2.92	0.126
Condition	1	773960	773960	773960	4.16	0.076
Season	1	20093	20093	20093	0.11	0.751
Year	1	2630073	2630073	2630073	14.13	0.006
Error	8	1488936	1488936	186117		
Total	15	5587097				

3-Way ANOVA table for Region C total abundance (Table 3.5)

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Condition*Season	1	2916	2916	2916	0.65	0.445
Condition*Year	1	8742	8742	8742	1.94	0.201
Season*Year	1	21462	21462	21462	4.76	0.061
Condition*Season*Year	1	1089	1089	1089	0.24	0.636
Condition	1	90	90	90	0.02	0.891
Season	1	12	12	12	0.00	0.960
Year	1	18496	18496	18496	4.10	0.077
Error	8	36071	36071	4509		
Total	15	88879				

3-Way ANOVA table for Region D total abundance (Table 3.5)

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Condition*Season	1	1139.1	1139.1	1139.1	20.18	0.002
Condition*Year	1	390.1	390.1	390.1	6.91	0.030
Season*Year	1	473.1	473.1	473.1	8.38	0.020
Condition*Season*Year	1	5.1	5.1	5.1	0.09	0.772
Condition	1	2002.6	2002.6	2002.6	35.48	0.000
Season	1	18564.1	18564.1	18564.1	328.93	0.000
Year	1	0.6	0.6	0.6	0.01	0.923
Error	8	451.5	451.5	56.4		
Total	15	23025.9				

3-Way ANOVA table for Region A total biomass (Table 3.12)

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Condition*Season	1	228078	228078	228078	0.02	0.901
Condition*Year	1	13163654	13163654	13163654	0.95	0.358
Season*Year	1	4119175	4119175	4119175	0.30	0.600
Condition*Season*Year	1	4183150	4183150	4183150	0.30	0.597
Condition	1	91582508	91582508	91582508	6.62	0.033
Season	1	22	22	22	0.00	0.999
Year	1	17257170	17257170	17257170	1.25	0.296
Error	8	110651812	110651812	13831477		
Total	15	241185568				

3-Way ANOVA table for Region B total biomass (Table 3.12)

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Condition*Season	1	147142783	147142783	147142783	4.90	0.058
Condition*Year	1	110367474	110367474	110367474	3.68	0.092
Season*Year	1	1015575	1015575	1015575	0.03	0.859
Condition*Season*Year	1	6500243	6500243	6500243	0.22	0.654
Condition	1	212092401	212092401	212092401	7.06	0.029
Season	1	137218792	137218792	137218792	4.57	0.065
Year	1	275444061	275444061	275444061	9.17	0.016
Error	8	240206020	240206020	30025753		
Total	15	1129987350				

3-Way ANOVA table for Region C total biomass (Table 3.12)

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Condition*Season	1	305008	305008	305008	0.01	0.924
Condition*Year	1	17170457	17170457	17170457	0.54	0.482
Season*Year	1	12542045	12542045	12542045	0.40	0.546
Condition*Season*Year	1	42349834	42349834	42349834	1.34	0.280
Condition	1	147387491	147387491	147387491	4.67	0.063
Season	1	19201705	19201705	19201705	0.61	0.458
Year	1	81281494	81281494	81281494	2.58	0.147
Error	8	252420645	252420645	31552581		
Total	15	572658679				

3-Way ANOVA table for Region D total biomass (Table 3.12)

Source	DF	Seq SS	Adj SS	Adj MS	F	P
Condition*Season	1	36787	36787	36787	0.19	0.675
Condition*Year	1	75598	75598	75598	0.39	0.550
Season*Year	1	109230	109230	109230	0.56	0.474
Condition*Season*Year	1	428370	428370	428370	2.21	0.175
Condition	1	374728	374728	374728	1.93	0.202
Season	1	191494	191494	191494	0.99	0.349
Year	1	78204	78204	78204	0.40	0.543
Error	8	1550889	1550889	193861		
Total	15	2845300				

PERMANOVA - species abundance data, 4th root transformed, all sites.

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Permutation of residuals under a reduced model
Number of permutations: 9999

Factors

Name	Abbrev.	Type	Levels
Year	Ye	Fixed	2
Season	Se	Fixed	2
Condition	Co	Fixed	2
Biogeography	Bi	Fixed	2
Region	Re	Random	4

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1630.3	1630.3	2.6935	0.1373	800
Se	1	2022.9	2022.9	1.3226	0.3231	801
Co	1	4121	4121	1.4046	0.3127	801
Bi	1	44210	44210	3.6438	0.3271	3
Re(Bi)	2	24266	12133	34.58	0.0001	9944
YexSe	1	756.68	756.68	2.4826	0.182	7132
YexCo	1	254.03	254.03	0.58723	0.6085	7156
YexBi	1	882.45	882.45	1.458	0.3088	801
SexCo	1	606.13	606.13	0.96108	0.4576	7149
SexBi	1	783.73	783.73	0.51243	0.7002	798
CoxBi	1	3390.7	3390.7	1.1557	0.3796	801
YexRe(Bi)	2	1210.5	605.26	1.7251	0.0517	9924
SexRe(Bi)	2	3058.8	1529.4	4.359	0.0001	9922
CoxRe(Bi)	2	5868	2934	8.3622	0.0001	9918
YexSexCo	1	640.39	640.39	1.8701	0.2685	9489
YexSexBi	1	798.18	798.18	2.6187	0.1884	7106
YexCoxBi	1	399.37	399.37	0.92321	0.4672	7184
SexCoxBi	1	398.19	398.19	0.63137	0.5882	7209
YexSexRe(Bi)	2	609.59	304.8	0.8687	0.6034	9914
YexCoxRe(Bi)	2	865.18	432.59	1.2329	0.2682	9929
SexCoxRe(Bi)	2	1261.4	630.68	1.7975	0.035	9930
YexSexCoxBi	1	392.59	392.59	1.1464	0.4022	9507
YexSexCoxRe(Bi)	2	684.88	342.44	0.97599	0.4971	9927
Res	32	11228	350.86			
Total	63	1.1034E5				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	32.033	5.6597
S(Se)	15.421	3.9269
S(Co)	37.096	6.0906
S(Bi)	1002.4	31.661
V(Re(Bi))	736.38	27.136
S(YexSe)	28.243	5.3144
S(YexCo)	-11.16	-3.3407
S(YexBi)	17.324	4.1623
S(SexCo)	-1.5342	-1.2386
S(SexBi)	-46.606	-6.8269
S(CoxBi)	28.544	5.3426
V(YexRe(Bi))	31.8	5.6392
V(SexRe(Bi))	147.32	12.138
V(CoxRe(Bi))	322.89	17.969
S(YexSexCo)	37.244	6.1028
S(YexSexBi)	61.673	7.8532
S(YexCoxBi)	-4.1524	-2.0377
S(SexCoxBi)	-29.061	-5.3908
V(YexSexRe(Bi))	-11.517	-3.3936
V(YexCoxRe(Bi))	20.432	4.5201
V(SexCoxRe(Bi))	69.954	8.3639
S(YexSexCoxBi)	12.537	3.5408
V(YexSexCoxRe(Bi))	-4.2125	-2.0524
V(Res)	350.86	18.731

PERMANOVA (pairwise tests) - species abundance data, 4th root transformed, all sites.

PAIR-WISE TESTS

Term 'SexCoxRe(Bi)' for pairs of levels of factor 'Season'

Within level 'N-U' of factor 'Condition'
Within level 'West' of factor 'Biogeography'
Within level 'B' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
W, S	2.1491	0.0294	270	0.0341

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	66.207	
S	63.61	72.264

Within level 'N-U' of factor 'Condition'
Within level 'West' of factor 'Biogeography'
Within level 'A' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
W, S	1.4023	0.0981	270	0.1613

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	78.462	
S	78.699	81.15

Within level 'N-U' of factor 'Condition'
Within level 'South' of factor 'Biogeography'
Within level 'D' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
W, S	2.1286	0.0263	270	0.0281

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	67.87	
S	47.938	55.909

Within level 'N-U' of factor 'Condition'
Within level 'South' of factor 'Biogeography'
Within level 'C' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
W, S	1.602	0.0951	270	0.1144

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	76.646	
S	74.827	80.775

Within level 'U' of factor 'Condition'
Within level 'West' of factor 'Biogeography'
Within level 'B' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
W, S	1.4363	0.0955	270	0.1519

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	75.005	
S	72.457	73.553

Within level 'U' of factor 'Condition'
Within level 'West' of factor 'Biogeography'
Within level 'A' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
W, S	1.4937	0.1011	270	0.14

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	82.309	
S	78.964	82.149

Within level 'U' of factor 'Condition'
Within level 'South' of factor 'Biogeography'
Within level 'D' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
W, S	1.2379	0.2477	270	0.2434

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	59.579	
S	61.582	66.731

Within level 'U' of factor 'Condition'
Within level 'South' of factor 'Biogeography'
Within level 'C' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
W, S	1.5455	0.0835	270	0.1145

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	81.86	
S	69.195	64.341

Term 'SexCoxRe(Bi)' for pairs of levels of factor 'Condition'

Within level 'W' of factor 'Season'
Within level 'West' of factor 'Biogeography'
Within level 'B' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	2.4648	0.0311	270	0.0174

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	66.207	
U	59.727	75.005

Within level 'W' of factor 'Season'
Within level 'West' of factor 'Biogeography'
Within level 'A' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	4.8164	0.0308	270	0.0021

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	78.462	
U	49.068	82.309

Within level 'W' of factor 'Season'
Within level 'South' of factor 'Biogeography'
Within level 'D' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	1.7426	0.0346	270	0.0578

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	67.87	
U	54.946	59.579

Within level 'W' of factor 'Season'
Within level 'South' of factor 'Biogeography'
Within level 'C' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	1.5988	0.0753	269	0.1005

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	76.646	
U	74.23	81.86

Within level 'S' of factor 'Season'
Within level 'West' of factor 'Biogeography'
Within level 'B' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	2.4868	0.0295	269	0.0133

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	72.264	
U	63.223	73.553

Within level 'S' of factor 'Season'
Within level 'West' of factor 'Biogeography'
Within level 'A' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	4.205	0.0284	270	0.0053

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	81.15	
U	60.498	82.149

Within level 'S' of factor 'Season'
Within level 'South' of factor 'Biogeography'
Within level 'D' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	1.5252	0.0775	270	0.1133

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	55.909	
U	56.202	66.731

Within level 'S' of factor 'Season'
Within level 'South' of factor 'Biogeography'
Within level 'C' of factor 'Region'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	1.2964	0.2589	270	0.2263

Denominators

Groups	Denominator	Den.df

```
N-U, U  1*Res             4
```

Average Similarity between/within groups

```
        N-U       U
N-U  80.775
U    71.827  64.341
```

Term 'SexCoxRe(Bi)' for pairs of levels of factor 'Region'

Within level 'W' of factor 'Season'
Within level 'N-U' of factor 'Condition'
Within level 'West' of factor 'Biogeography'

```
                          Unique
Groups       t  P(perm)   perms   P(MC)
B, A    4.9027   0.0291     270  0.0012
```

Denominators

```
Groups  Denominator  Den.df
B, A    1*Res             4
```

Average Similarity between/within groups

```
        B       A
B  66.207
A  37.561  78.462
```

Within level 'W' of factor 'Season'
Within level 'N-U' of factor 'Condition'
Within level 'South' of factor 'Biogeography'

```
                         Unique
Groups      t  P(perm)   perms   P(MC)
D, C    2.563   0.0342     270  0.0158
```

Denominators

```
Groups  Denominator  Den.df
D, C    1*Res             4
```

Average Similarity between/within groups

```
        D       C
D   67.87
C  56.308  76.646
```

Within level 'W' of factor 'Season'
Within level 'U' of factor 'Condition'
Within level 'West' of factor 'Biogeography'

```
                          Unique
Groups       t  P(perm)   perms   P(MC)
B, A    3.8828   0.0254     270  0.0044
```

Denominators

```
Groups  Denominator  Den.df
B, A    1*Res             4
```

Average Similarity between/within groups

```
        B       A
B  75.005
A  53.415  82.309
```

Within level 'W' of factor 'Season'
Within level 'U' of factor 'Condition'
Within level 'South' of factor 'Biogeography'

Groups	t	P(perm)	Unique perms	P(MC)
D, C	2.1365	0.0277	270	0.0259

Denominators

Groups	Denominator	Den.df
D, C	1*Res	4

Average Similarity between/within groups

	D	C
D	59.579	
C	55.856	81.86

Within level 'S' of factor 'Season'
Within level 'N-U' of factor 'Condition'
Within level 'West' of factor 'Biogeography'

Groups	t	P(perm)	Unique perms	P(MC)
B, A	7.2017	0.0271	270	0.0003

Denominators

Groups	Denominator	Den.df
B, A	1*Res	4

Average Similarity between/within groups

	B	A
B	72.264	
A	30.909	81.15

Within level 'S' of factor 'Season'
Within level 'N-U' of factor 'Condition'
Within level 'South' of factor 'Biogeography'

Groups	t	P(perm)	Unique perms	P(MC)
D, C	2.8422	0.0257	270	0.0112

Denominators

Groups	Denominator	Den.df
D, C	1*Res	4

Average Similarity between/within groups

	D	C
D	55.909	
C	44.979	80.775

Within level 'S' of factor 'Season'
Within level 'U' of factor 'Condition'
Within level 'West' of factor 'Biogeography'

Groups	t	P(perm)	Unique perms	P(MC)
B, A	3.8639	0.0281	270	0.0055

Denominators

Groups	Denominator	Den.df

```
B, A    1*Res             4
```

Average Similarity between/within groups

```
        B       A
B  73.553
A  53.281  82.149
```

Within level 'S' of factor 'Season'
Within level 'U' of factor 'Condition'
Within level 'South' of factor 'Biogeography'

```
                        Unique
Groups       t  P(perm)   perms   P(MC)
D, C    2.4527   0.0294     270  0.0155
```

Denominators

```
Groups  Denominator  Den.df
D, C    1*Res             4
```

Average Similarity between/within groups

```
        D       C
D  66.731
C  53.684  64.341
```

PERMANOVA - species abundance data, 4th root transformed, region A.

PERMANOVA table of results

```
                                                  Unique
Source    df      SS      MS  Pseudo-F  P(perm)   perms   P(MC)
Ye         1  339.67  339.67    1.9145  0.1414    9925  0.142
Se         1  341.05  341.05    1.9223  0.1278    9919 0.1414
Co         1    6980    6980    39.341  0.0004    9921 0.0001
YexSe      1  125.97  125.97      0.71  0.6005    9925 0.5643
YexCo      1  298.72  298.72    1.6837  0.1736    9926 0.1795
SexCo      1  409.36  409.36    2.3073  0.0889    9925 0.0962
YexSexCo   1  136.47  136.47   0.76916  0.5598    9929 0.5269
Res        8  1419.4  177.42
Total     15   10051
```

Details of the expected mean squares (EMS) for the model

```
Source    EMS
Ye        1*V(Res) + 8*S(Ye)
Se        1*V(Res) + 8*S(Se)
Co        1*V(Res) + 8*S(Co)
YexSe     1*V(Res) + 4*S(YexSe)
YexCo     1*V(Res) + 4*S(YexCo)
SexCo     1*V(Res) + 4*S(SexCo)
YexSexCo  1*V(Res) + 2*S(YexSexCo)
Res       1*V(Res)
```

Construction of Pseudo-F ratio(s) from mean squares

```
Source    Numerator   Denominator  Num.df  Den.df
Ye        1*Ye        1*Res             1       8
Se        1*Se        1*Res             1       8
Co        1*Co        1*Res             1       8
YexSe     1*YexSe     1*Res             1       8
YexCo     1*YexCo     1*Res             1       8
SexCo     1*SexCo     1*Res             1       8
YexSexCo  1*YexSexCo  1*Res             1       8
```

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	20.281	4.5034
S(Se)	20.454	4.5226
S(Co)	850.32	29.16
S(YexSe)	-12.863	-3.5865
S(YexCo)	30.325	5.5068
S(SexCo)	57.986	7.6148
S(YexSexCo)	-20.478	-4.5252
V(Res)	177.42	13.32

PERMANOVA - species abundance data, 4th root transformed, region B.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Ye	1	1586.1	1586.1	5.4914	0.0044	9911	0.0048
Se	1	1528.9	1528.9	5.2934	0.0042	9912	0.0039
Co	1	3144.5	3144.5	10.887	0.0004	9921	0.0005
YexSe	1	639.3	639.3	2.2134	0.0611	9925	0.0767
YexCo	1	287	287	0.99364	0.4489	9925	0.4268
SexCo	1	393.02	393.02	1.3607	0.249	9915	0.2692
YexSexCo	1	255.08	255.08	0.88315	0.517	9926	0.4859
Res	8	2310.7	288.83				
Total	15	10145					

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	162.16	12.734
S(Se)	155.01	12.45
S(Co)	356.96	18.893
S(YexSe)	87.618	9.3605
S(YexCo)	-0.45894	-0.67745
S(SexCo)	26.046	5.1035
S(YexSexCo)	-16.875	-4.1079
V(Res)	288.83	16.995

PERMANOVA - species abundance data, 4th root transformed, region C.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	696.87	696.87	2.6194	0.0297	9931
Se	1	1191.5	1191.5	4.4787	0.0044	9937
Co	1	996.67	996.67	3.7463	0.0084	9934
YexSe	1	427.57	427.57	1.6071	0.1852	9923
YexCo	1	405.11	405.11	1.5227	0.212	9906
SexCo	1	121.36	121.36	0.45617	0.8174	9923
YexSexCo	1	370.08	370.08	1.3911	0.2652	9932
Res	8	2128.3	266.04			
Total	15	6337.5				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	53.853	7.3385
S(Se)	115.69	10.756
S(Co)	91.329	9.5566
S(YexSe)	40.382	6.3547
S(YexCo)	34.767	5.8964
S(SexCo)	-36.171	-6.0142
S(YexSexCo)	52.02	7.2125
V(Res)	266.04	16.311

PERMANOVA - species abundance data, 4th root transformed, region D.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1100.7	1100.7	1.6399	0.1453	9906
Se	1	2804	2804	4.1778	0.0047	9902
Co	1	2258.5	2258.5	3.3651	0.0081	9914
YexSe	1	971.61	971.61	1.4477	0.2031	9917
YexCo	1	527.75	527.75	0.78633	0.6132	9926
SexCo	1	1341.9	1341.9	1.9994	0.0564	9919
YexSexCo	1	956.23	956.23	1.4247	0.2287	9914
Res	8	5369.3	671.16			
Total	15	15330				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	53.688	7.3272
S(Se)	266.6	16.328
S(Co)	198.42	14.086
S(YexSe)	75.112	8.6667
S(YexCo)	-35.852	-5.9877
S(SexCo)	167.7	12.95
S(YexSexCo)	142.54	11.939
V(Res)	671.16	25.907

PERMDISP – Region A, fourth root transformed species abundance data

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.31668 df1: 1 df2: 14
P(perm): 0.5985

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.56274	0.5873

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	13.949	0.9599
U	8	12.978	1.433

PERMDISP – Region B, fourth root transformed species abundance data

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 3.291 df1: 1 df2: 14
P(perm): 0.1246

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	1.8141	0.1291

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	22.617	2.1565
U	8	17.614	1.7193

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 6.5651 df1: 1 df2: 14
P(perm): 0.0226

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	2.5623	2.28E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	25.263	1.6427
2	8	20.071	1.1869

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.99908 df1: 1 df2: 14
P(perm): 0.3383

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.99954	0.3525

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	23.884	1.738
S	8	21.856	1.0482

PERMDISP – Region C, fourth root transformed species abundance data.

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.87422 df1: 1 df2: 14
P(perm): 0.4165

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.935	0.4123

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	15.729	1.2672
S	8	18.402	2.5632

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 11.126 df1: 1 df2: 14
P(perm): 0.0122

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	3.3356	1.14E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	14.775	1.6809
2	8	21.423	1.071

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 1.3656 df1: 1 df2: 14
P(perm): 0.3019

PAIRWISE COMPARISONS

Groups	t	P(perm)
(U,N-U)	1.1686	0.2889

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
U	8	19.044	2.3841
N-U	8	15.446	1.9487

PERMDISP – Region D, fourth root transformed species abundance data.

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 4.277 df1: 1 df2: 14
P(perm): 0.0736

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	2.0681	7.26E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	30.91	1.6876
U	8	24.879	2.3783

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 5.9615E-3 df1: 1 df2: 14
P(perm): 0.9396

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	7.7211E-2	0.937

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	27.39	2.1097
S	8	27.604	1.7881

ANOSIM – All sites, fourth root transformed species abundance data.

Region
Global Test
Sample statistic (Global R): 0.891
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample from a large number)
Number of permuted statistics greater than or equal to Global R: 0
Pairwise Tests

Groups	R Statistic	Significance Level %	Possible Permutations	Actual Permutations	Number >= Observed
B, D	0.988	0.1	300540195	999	0
B, A	0.845	0.1	300540195	999	0
B, C	0.998	0.1	300540195	999	0
D, A	0.981	0.1	300540195	999	0
D, C	0.525	0.1	300540195	999	0
A, C	0.995	0.1	300540195	999	0

ANOSIM – Region A, fourth root transformed species abundance data.

Condition
Global Test
Sample statistic (Global R): 0.979
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 0

ANOSIM – Region B, fourth root transformed species abundance data.

Condition
Global Test
Sample statistic (Global R): 0.608
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 0

ANOSIM – Region C, fourth root transformed species abundance data.

Condition
Global Test
Sample statistic (Global R): 0.229
Significance level of sample statistic: 0.4%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 3

Season
Global Test
Sample statistic (Global R): 0.27
Significance level of sample statistic: 0.4%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 3

ANOSIM – Region D, fourth root transformed species abundance data.

Condition
Global Test
Sample statistic (Global R): 0.246
Significance level of sample statistic: 1.9%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 18

Season
Global Test
Sample statistic (Global R): 0.339
Significance level of sample statistic: 0.3%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 2

SIMPER – Region A, fourth root transformed species abundance data.

Condition
Group N-U
Average similarity: 79.17

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
A.quadrispinosa	4.02	21.29	6.55	26.90	26.90
E.natalensis	3.90	20.34	5.40	25.70	52.59
T.granulatus	2.72	14.94	10.99	18.87	71.46
P.latipes	1.61	7.95	6.54	10.04	81.51
G.latipes	1.44	5.89	1.62	7.44	88.95
G.psammodytes	1.16	3.95	1.02	4.98	93.93

Group U
Average similarity: 80.36

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
G.latipes	3.88	14.58	4.40	18.15	18.15
E.kensleyi	2.88	11.00	11.12	13.68	31.83
A.quadrispinosa	3.03	10.54	3.45	13.12	44.95
P.latipes	2.39	9.70	6.84	12.07	57.02
G.psammodytes	2.66	9.54	4.04	11.87	68.89
E.longicornis	2.33	9.02	4.60	11.23	80.12
E.natalensis	1.94	7.44	4.68	9.26	89.38
Nemertean	1.56	5.09	1.59	6.33	95.71

Groups N-U & U
Average dissimilarity = 45.37

Species	Group N-U Av.Abund	Group U Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
G.latipes	1.44	3.88	6.09	2.35	13.41	13.41
E.kensleyi	0.44	2.88	6.02	3.56	13.26	26.67
E.longicornis	0.00	2.33	5.81	4.87	12.81	39.48
E.natalensis	3.90	1.94	4.96	2.28	10.93	50.41
T.granulatus	2.72	1.20	3.87	1.74	8.53	58.94
G.psammodytes	1.16	2.66	3.87	1.59	8.53	67.47
Nemertean	0.27	1.56	3.36	1.92	7.41	74.88
A.quadrispinosa	4.02	3.03	3.00	1.22	6.61	81.49
Amph A	0.93	0.13	2.15	1.50	4.73	86.22
P.latipes	1.61	2.39	2.07	1.90	4.56	90.78

SIMPER – Region B, fourth root transformed species abundance data.

Condition

Group N-U
Average similarity: 66.02

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
A.quadrispinosa	2.65	8.75	4.68	13.26	13.26
E.natalensis	2.57	8.43	3.00	12.77	26.03
D.serra	2.76	7.75	3.04	11.74	37.76
S.squamata	2.52	6.11	2.74	9.25	47.02
E.kensleyi	2.26	5.60	2.43	8.48	55.49
G.psammodytes	1.76	5.45	3.06	8.25	63.74
E.longicornis	1.96	5.22	3.13	7.91	71.66
G.benguellana	1.47	4.85	4.85	7.35	79.00
Nemertean	2.68	4.83	0.96	7.32	86.32
Cumacean A	1.63	3.07	1.02	4.65	90.97

Group U
Average similarity: 73.24

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
E.kensleyi	3.96	9.51	4.30	12.99	12.99
G.psammodytes	3.98	9.04	6.60	12.34	25.33
A.quadrispinosa	3.18	7.64	5.70	10.44	35.77
D.serra	3.09	6.67	4.60	9.11	44.88
E.longicornis	2.56	5.51	4.06	7.52	52.40
E.natalensis	2.08	4.63	3.03	6.32	58.72
Orbina B	1.84	3.78	4.01	5.16	63.88
P.latipes	1.76	3.58	1.61	4.88	68.77
S.squamata	1.96	3.14	1.58	4.29	73.05
Cumacean A	2.12	2.78	1.02	3.80	76.85
T.granulatus	1.57	2.62	1.45	3.57	80.43
N.capense	1.42	2.56	1.64	3.50	83.92
P.herdmani	1.33	2.41	1.60	3.29	87.21
G.benguellana	1.25	2.30	1.61	3.14	90.35

Groups N-U & U
Average dissimilarity = 40.10

Species	Group N-U Av.Abund	Group U Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
G.psammodytes	1.76	3.98	3.29	2.67	8.20	8.20
Nemertean	2.68	1.18	3.11	1.62	7.75	15.95
E.kensleyi	2.26	3.96	2.90	1.51	7.24	23.18
Orbina B	0.00	1.84	2.78	3.20	6.92	30.11
T.granulatus	0.00	1.57	2.33	1.86	5.82	35.93
Cumacean A	1.63	2.12	2.28	1.32	5.70	41.63
P.latipes	0.45	1.76	2.22	1.72	5.55	47.17
S.squamata	2.52	1.96	2.09	1.30	5.21	52.38
B.digitalis	1.28	1.33	1.73	1.36	4.33	56.70
P.herdmani	0.30	1.33	1.69	1.64	4.21	60.92
E.longicornis	1.96	2.56	1.63	1.48	4.06	64.97
D.serra	2.76	3.09	1.62	1.25	4.05	69.02
N.capense	1.33	1.42	1.37	1.23	3.42	72.44
B.cunctator	0.00	0.85	1.17	0.72	2.91	75.35
S.capense	0.41	0.93	1.15	1.25	2.87	78.22
Cumacean B (H)	0.58	0.64	1.14	0.99	2.84	81.06
E.natalensis	2.57	2.08	1.12	1.35	2.80	83.86
A.quadrispinosa	2.65	3.18	1.04	1.56	2.60	86.45
G.benguellana	1.47	1.25	0.73	0.87	1.83	88.28
Isopod A	0.13	0.41	0.65	0.81	1.62	89.90
U.coxalis	0.00	0.41	0.59	0.54	1.48	91.38

SIMPER – Region C, fourth root transformed species abundance data.

Condition
Group U
Average similarity: 70.87

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
D.serra	1.91	9.29	4.49	13.11	13.11
D.sordidus	1.89	8.86	7.20	12.50	25.61
G.psammodytes	1.84	8.76	7.19	12.35	37.96
E.natalensis	1.82	8.46	3.71	11.94	49.90
B.rhodostoma	1.87	8.35	5.41	11.78	61.68
E.longicornis	1.58	8.34	5.87	11.77	73.46
T.sp. nov	1.62	6.78	1.60	9.57	83.02
P.latipes	1.56	6.21	1.54	8.76	91.78

Group N-U
Average similarity: 76.49

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
E.natalensis	2.52	13.39	4.51	17.51	17.51
D.serra	1.83	10.52	4.98	13.76	31.27
G.psammodytes	1.85	10.42	6.80	13.62	44.89
P.latipes	1.67	9.52	5.85	12.45	57.34
T.sp. nov	1.70	8.88	4.11	11.61	68.95
D.sordidus	1.39	7.59	6.18	9.93	78.88
E.longicornis	1.41	6.46	1.52	8.45	87.33
B.rhodostoma	1.44	6.40	1.59	8.36	95.69

Groups U & N-U
Average dissimilarity = 29.32

Species	Group U Av.Abund	Group N-U Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
E.longicornis np	1.28	0.34	3.20	1.40	10.90	10.90
E.natalensis	1.82	2.52	2.68	1.42	9.13	20.03
G.incerta	0.00	0.89	2.64	1.22	9.02	29.05
B.rhodostoma	1.87	1.44	2.24	1.16	7.64	36.69
T.sp. nov	1.62	1.70	2.03	1.25	6.92	43.61
P.latipes	1.56	1.67	1.85	1.02	6.32	49.92
D.sordidus	1.89	1.39	1.75	1.09	5.96	55.89
E.longicornis	1.58	1.41	1.58	1.01	5.40	61.29
G.psammodytes	1.84	1.85	1.32	1.21	4.51	65.80
D.serra	1.91	1.83	1.26	1.30	4.29	70.09
B.pura	0.38	0.13	1.16	0.80	3.96	74.05
S.capense	0.38	0.00	1.09	0.76	3.73	77.78
P.longimanus	0.25	0.13	0.98	0.65	3.35	81.13
U.coxalis	0.32	0.00	0.89	0.56	3.04	84.17
L.tetraura	0.00	0.30	0.83	0.57	2.82	86.99
S.squamata	0.29	0.00	0.79	0.57	2.70	89.69
Tylos capensis	0.25	0.00	0.77	0.56	2.64	92.33

Season
Group W
Average similarity: 76.38

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
E.natalensis	2.56	13.09	5.68	17.13	17.13
T.sp. nov	2.13	10.95	7.62	14.33	31.47
G.psammodytes	1.80	9.88	7.56	12.94	44.40
D.serra	1.60	8.53	6.43	11.17	55.57
P.latipes	1.67	8.18	4.30	10.71	66.29
D.sordidus	1.42	7.28	8.14	9.53	75.81
B.rhodostoma	1.58	6.80	1.62	8.90	84.72
E.longicornis	1.28	5.28	1.63	6.91	91.63

Group S
Average similarity: 72.14

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
D.serra	2.14	12.15	6.01	16.84	16.84
E.longicornis	1.72	9.95	4.72	13.79	30.63
G.psammodytes	1.89	9.46	5.92	13.11	43.74
D.sordidus	1.86	9.20	5.08	12.75	56.49
E.natalensis	1.78	8.92	3.54	12.36	68.85
B.rhodostoma	1.72	8.17	4.48	11.32	80.17
P.latipes	1.56	7.23	1.64	10.03	90.20

Groups W & S
Average dissimilarity = 29.82

Species	Group W Av.Abund	Group S Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
E.longicornis np	1.18	0.43	3.23	1.39	10.83	10.83
E.natalensis	2.56	1.78	2.87	1.53	9.62	20.45
T.sp. nov	2.13	1.20	2.73	1.66	9.14	29.59
B.rhodostoma	1.58	1.72	2.29	1.33	7.69	37.28
G.incerta	0.54	0.35	1.98	0.90	6.65	43.93
P.latipes	1.67	1.56	1.75	1.00	5.87	49.80
E.longicornis	1.28	1.72	1.71	0.91	5.73	55.53
D.sordidus	1.42	1.86	1.69	1.15	5.67	61.20
D.serra	1.60	2.14	1.60	1.67	5.36	66.56
G.psammodytes	1.80	1.89	1.40	1.53	4.71	71.27
B.pura	0.38	0.13	1.22	0.80	4.09	75.36
S.capense	0.38	0.00	1.09	0.76	3.65	79.01
P.longimanus	0.25	0.13	0.95	0.66	3.18	82.19
U.coxalis	0.32	0.00	0.89	0.56	2.97	85.16
Cirratulid	0.00	0.30	0.76	0.57	2.55	87.70
L.tetraura	0.15	0.15	0.75	0.52	2.53	90.23

SIMPER – Region D, fourth root transformed species abundance data.

Condition
Group N-U
Average similarity: 53.92

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
E.longicornis	2.05	10.45	3.94	19.37	19.37
P.latipes	1.76	8.43	4.29	15.64	35.01
G.psammodytes	1.54	7.38	3.28	13.70	48.71
B.rhodostoma	1.38	6.62	2.74	12.27	60.98
E.natalensis	1.22	5.78	1.44	10.71	71.69
E.longicornis np	1.27	4.09	1.00	7.59	79.29
L.tetraura	0.79	1.95	0.69	3.61	82.89
T.sp. nov	0.55	1.50	0.50	2.77	85.67
M.longimana	0.52	1.08	0.49	2.00	87.67
Nemertean	0.69	1.05	0.50	1.95	89.62
U.coxalis	0.87	0.97	0.34	1.80	91.42

Group U
Average similarity: 62.26

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
P.latipes	1.77	7.92	3.98	12.72	12.72
E.natalensis	1.63	7.82	4.44	12.56	25.29
Bausto sp	1.52	7.41	5.02	11.89	37.18
E.longicornis	1.56	7.05	1.65	11.32	48.50
E.longicornis np	1.17	4.76	1.62	7.65	56.15
B.rhodostoma	1.12	4.71	1.62	7.57	63.72
U.coxalis	1.13	4.63	1.58	7.43	71.15
G.psammodytes	1.19	4.21	1.02	6.76	77.92
Isopod A	0.85	3.02	1.04	4.85	82.76
T.sp. nov	0.89	2.57	0.71	4.12	86.89
D.serra	0.85	2.14	0.72	3.44	90.33

Groups N-U & U
Average dissimilarity = 46.32

Species	Group N-U Av.Abund	Group U Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Bausto sp	0.21	1.52	3.87	2.34	8.35	8.35
U.coxalis	0.87	1.13	3.25	2.05	7.02	15.37
Isopod A	0.61	0.85	2.29	1.48	4.95	20.32
D.serra	0.46	0.85	2.23	1.15	4.81	25.12
T.sp. nov	0.55	0.89	2.15	1.27	4.63	29.76
E.longicornis np	1.27	1.17	2.13	1.24	4.59	34.35
Nemertean	0.69	0.67	1.94	1.20	4.18	38.53
D.sordidus	0.13	0.73	1.90	1.17	4.09	42.63
L.tetraura	0.79	0.56	1.89	1.17	4.09	46.71
G.psammodytes	1.54	1.19	1.85	1.04	4.00	50.71
E.longicornis	2.05	1.56	1.61	0.93	3.48	54.19
P.latipes	1.76	1.77	1.52	1.46	3.27	57.46
G.incerta	0.52	0.15	1.51	0.77	3.26	60.73
E.natalensis	1.22	1.63	1.43	1.10	3.09	63.82
M.longimana	0.52	0.13	1.43	0.94	3.09	66.91
N.capense	0.59	0.13	1.41	1.01	3.05	69.96
S.squamata	0.52	0.25	1.40	0.97	3.03	72.98
B.rhodostoma	1.38	1.12	1.39	0.96	3.01	75.99
Orbiniidae A	0.52	0.15	1.37	0.75	2.96	78.95
Emerita	0.36	0.19	1.06	0.66	2.28	81.23
P.longimanus	0.25	0.27	1.02	0.76	2.20	83.43
Tylos capensis	0.25	0.16	1.01	0.66	2.17	85.60
S.capense	0.34	0.13	0.98	0.68	2.12	87.73
Cumacean A	0.00	0.38	0.96	0.75	2.08	89.81
B.pura	0.13	0.13	0.56	0.52	1.20	91.01

Season
Group W
Average similarity: 58.71

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
E.natalensis	1.49	9.43	5.39	16.06	16.06
E.longicornis	1.57	9.12	1.62	15.54	31.60
P.latipes	1.39	8.79	4.45	14.97	46.57
G.psammodytes	1.30	6.96	1.53	11.86	58.43
B.rhodostoma	1.21	6.32	1.54	10.76	69.19
E.longicornis np	1.01	4.46	1.01	7.60	76.79
T.sp. nov	0.99	4.24	1.04	7.22	84.01
L.tetraura	0.69	2.48	0.72	4.22	88.23
Bausto sp	0.76	1.84	0.51	3.13	91.36

Group S
Average similarity: 58.40

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
P.latipes	2.13	8.89	5.04	15.23	15.23
E.longicornis	2.04	8.48	8.09	14.52	29.75
B.rhodostoma	1.29	5.04	5.48	8.63	38.37
G.psammodytes	1.43	4.72	1.61	8.09	46.46
U.coxalis	1.54	4.69	1.49	8.03	54.49
E.natalensis	1.36	4.57	1.54	7.82	62.31
E.longicornis np	1.44	4.50	1.63	7.71	70.02
Isopod A	1.21	4.12	1.65	7.05	77.07
Bausto sp	0.97	2.35	0.71	4.03	81.09
D.serra	0.93	1.85	0.70	3.17	84.26
Nemertean	0.79	1.54	0.72	2.63	86.90
N.capense	0.71	1.52	0.73	2.60	89.50
D.sordidus	0.61	1.01	0.50	1.72	91.22

Groups W & S
Average dissimilarity = 46.73

	Group W	Group S				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
U.coxalis	0.46	1.54	3.39	1.55	7.26	7.26
Isopod A	0.25	1.21	2.81	1.78	6.01	13.27
Bausto sp	0.76	0.97	2.43	1.17	5.20	18.46
D.serra	0.38	0.93	2.28	1.20	4.88	23.35
T.sp. nov	0.99	0.45	2.20	1.37	4.70	28.05
E.longicornis np	1.01	1.44	2.11	1.19	4.52	32.57
P.latipes	1.39	2.13	2.08	1.95	4.46	37.02
L.tetraura	0.69	0.66	1.90	1.22	4.06	41.08
Nemertean	0.57	0.79	1.88	1.20	4.03	45.11
N.capense	0.00	0.71	1.83	1.25	3.93	49.04
Orbiniidae A	0.00	0.67	1.74	0.86	3.73	52.76
G.psammodytes	1.30	1.43	1.71	1.05	3.67	56.43
D.sordidus	0.25	0.61	1.67	1.00	3.56	60.00
E.longicornis	1.57	2.04	1.53	1.01	3.27	63.26
G.incerta	0.34	0.32	1.36	0.75	2.91	66.17
E.natalensis	1.49	1.36	1.35	1.03	2.88	69.06
Emerita	0.00	0.55	1.34	0.76	2.86	71.92
S.squamata	0.38	0.40	1.32	0.94	2.83	74.75
B.rhodostoma	1.21	1.29	1.25	1.11	2.67	77.41
S.capense	0.00	0.47	1.24	0.76	2.65	80.06
M.longimana	0.40	0.25	1.23	0.87	2.62	82.68
P.longimanus	0.13	0.40	1.13	0.81	2.41	85.10
Tylos capensis	0.13	0.29	1.02	0.65	2.18	87.28
Cumacean A	0.13	0.25	0.83	0.66	1.78	89.06
B.pura	0.00	0.25	0.69	0.57	1.48	90.54

PERMANOVA – All sites, presence/absence transformed species abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1272.1	1272.1	13.787	0.0504	801
Se	1	641.32	641.32	0.54721	0.588	801
Co	1	1860.2	1860.2	0.91796	0.4823	801
Bi	1	38636	38636	3.4422	0.3337	3
Re(Bi)	2	22449	11224	40.016	0.0001	9948
YexSe	1	785.91	785.91	11.998	0.033	7153
YexCo	1	327.29	327.29	1.7836	0.2615	7131
YexBi	1	617.96	617.96	6.6974	0.0835	801
SexCo	1	657.21	657.21	1.2215	0.3757	7181
SexBi	1	433.49	433.49	0.36988	0.7151	801
CoxBi	1	1238.6	1238.6	0.61118	0.6282	801
YexRe(Bi)	2	184.54	92.269	0.32895	0.8906	9945
SexRe(Bi)	2	2344	1172	4.1783	0.0001	9943
CoxRe(Bi)	2	4053	2026.5	7.2248	0.0001	9954
YexSexCo	1	569.77	569.77	3.2769	0.1902	9545
YexSexBi	1	624.37	624.37	9.5316	0.0674	7133
YexCoxBi	1	500.41	500.41	2.727	0.1886	7087
SexCoxBi	1	264.64	264.64	0.49185	0.6554	7191
YexSexRe(Bi)	2	131.01	65.505	0.23353	0.9181	9950
YexCoxRe(Bi)	2	367.01	183.5	0.65422	0.7162	9954
SexCoxRe(Bi)	2	1076.1	538.05	1.9182	0.0767	9948
YexSexCoxBi	1	204.43	204.43	1.1757	0.3725	9538
YexSexCoxRe(Bi)	2	347.75	173.88	0.6199	0.7304	9955
Res	32	8975.8	280.49			
Total	63	88561				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	36.87	6.0721
S(Se)	-16.583	-4.0722
S(Co)	-5.1954	-2.2793
S(Bi)	856.61	29.268
V(Re(Bi))	683.99	26.153
S(YexSe)	45.025	6.7101
S(YexCo)	8.9866	2.9978
S(YexBi)	32.856	5.732
S(SexCo)	7.4477	2.729
S(SexBi)	-46.155	-6.7938
S(CoxBi)	-49.247	-7.0176
V(YexRe(Bi))	-23.528	-4.8506
V(SexRe(Bi))	111.44	10.556
V(CoxRe(Bi))	218.25	14.773
S(YexSexCo)	49.487	7.0347
S(YexSexBi)	69.858	8.3581
S(YexCoxBi)	39.614	6.294
S(SexCoxBi)	-34.176	-5.846
V(YexSexRe(Bi))	-53.747	-7.3313
V(YexCoxRe(Bi))	-24.247	-4.9242
V(SexCoxRe(Bi))	64.388	8.0242
S(YexSexCoxBi)	7.6375	2.7636
V(YexSexCoxRe(Bi))	-53.309	-7.3013
V(Res)	280.49	16.748

PERMANOVA (Pairwise) – All sites, presence/absence transformed species abundance data.

Term 'Re(Bi)'

Within level 'West' of factor 'Biogeography'

Groups	t	P(perm)	Unique perms
B, A	10.605	0.0001	9942

Denominators

Groups	Denominator	Den.df
B, A	1*Res	16

Average Similarity between/within groups

	B	A
B	74.381	
A	48.633	75.888

Within level 'South' of factor 'Biogeography'

Groups	t	P(perm)	Unique perms
D, C	3.7347	0.0001	9945

Denominators

Groups	Denominator	Den.df
D, C	1*Res	16

Average Similarity between/within groups

	D	C
D	59.498	
C	58.718	79.389

PERMANOVA – Region A, presence/absence transformed species abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Ye	1	394.86	394.86	3.4561	0.0596	9919	0.0662
Se	1	-69.202	-69.202	Negative			
Co	1	2576.6	2576.6	22.553	0.0002	9920	0.0004
YexSe	1	302.65	302.65	2.649	0.0949	9926	0.1083
YexCo	1	536.6	536.6	4.6968	0.0342	9928	0.036
SexCo	1	375.33	375.33	3.2852	0.054	9938	0.0625
YexSexCo	1	119.24	119.24	1.0437	0.3887	9930	0.3769
Res	8	913.99	114.25				
Total	15	5150.1					

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	35.076	5.9225
S(Se)	-22.931	-4.7887
S(Co)	307.8	17.544
S(YexSe)	47.101	6.863
S(YexCo)	105.59	10.276
S(SexCo)	65.27	8.079
S(YexSexCo)	2.4944	1.5794
V(Res)	114.25	10.689

PERMANOVA (Pairwise) – Region A, presence/absence transformed species abundance data.

Term 'YexCo' for pairs of levels of factor 'Year'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
1, 2	2.1516	0.0777	154	0.0598

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	81.062	
2	76.122	86.373

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
1, 2	1.6091	0.1093	153	0.1196

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	86.569	
2	85.362	86.111

Term 'YexCo' for pairs of levels of factor 'Condition'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	2.307	0.0374	270	0.0371

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	81.062	
U	75.567	86.569

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	5.8617	0.0263	88	0.001

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	86.373	
U	64.585	86.111

PERMANOVA – Region B, presence/absence transformed species abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Ye	1	478.97	478.97	2.6226	0.069	9932	0.0853
Se	1	841.77	841.77	4.6092	0.0143	9930	0.0189
Co	1	1792.3	1792.3	9.814	0.0016	9921	0.0007
YexSe	1	357.39	357.39	1.9569	0.1385	9925	0.1521
YexCo	1	97.712	97.712	0.53503	0.6735	9942	0.6553
SexCo	1	370.74	370.74	2.03	0.1428	9934	0.1528
YexSexCo	1	29.789	29.789	0.16311	0.8792	9947	0.873
Res	8	1461	182.63				
Total	15	5429.7					

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	37.042	6.0862
S(Se)	82.393	9.0771
S(Co)	201.21	14.185
S(YexSe)	43.691	6.6099
S(YexCo)	-21.229	-4.6075
S(SexCo)	47.027	6.8577
S(YexSexCo)	-76.42	-8.7419
V(Res)	182.63	13.514

PERMANOVA – Region C, presence/absence transformed species abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Ye	1	427.09	427.09	2.0305	0.1186	9919	0.1377
Se	1	453.66	453.66	2.1568	0.0926	9937	0.1141
Co	1	654.08	654.08	3.1096	0.0218	9933	0.043
YexSe	1	78.403	78.403	0.37274	0.7918	9930	0.7818
YexCo	1	205.34	205.34	0.97622	0.4729	9929	0.4248
SexCo	1	128.95	128.95	0.61307	0.6719	9932	0.6311
YexSexCo	1	125.34	125.34	0.59591	0.6525	9933	0.6189
Res	8	1682.7	210.34				
Total	15	3755.6					

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	27.094	5.2052
S(Se)	30.414	5.5149
S(Co)	55.467	7.4476
S(YexSe)	-32.984	-5.7432
S(YexCo)	-1.2503	-1.1182
S(SexCo)	-20.347	-4.5108
S(YexSexCo)	-42.499	-6.5191
V(Res)	210.34	14.503

PERMANOVA – Region D, presence/absence transformed species abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms	P(MC)
Ye	1	773.69	773.69	1.2585	0.3169	9922	0.3124
Se	1	2192.5	2192.5	3.5665	0.0127	9943	0.0204
Co	1	2128.8	2128.8	3.4628	0.0106	9934	0.0241
YexSe	1	802.83	802.83	1.3059	0.2934	9919	0.2794
YexCo	1	355.06	355.06	0.57756	0.7057	9938	0.67
SexCo	1	1122.9	1122.9	1.8266	0.1198	9939	0.1477
YexSexCo	1	847.58	847.58	1.3787	0.2785	9936	0.2729
Res	8	4918.1	614.76				
Total	15	13141					

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	19.866	4.4572
S(Se)	197.22	14.044
S(Co)	189.26	13.757
S(YexSe)	47.019	6.857
S(YexCo)	-64.925	-8.0576
S(SexCo)	127.04	11.271
S(YexSexCo)	116.41	10.789
V(Res)	614.76	24.794

PERMDISP – Region A, presence/absence transformed species abundance data.

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 2.4161 df1: 1 df2: 14
P(perm): 0.1518

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	1.5544	0.1448

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	13.589	2.464
U	8	9.5005	0.92038

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 2.6244 df1: 1 df2: 14
P(perm): 0.1133

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	1.62	0.121

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	13.448	2.319
2	8	18.55	2.1315

PERMDISP – Region B, presence/absence transformed species abundance data.

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.64261 df1: 1 df2: 14
P(perm): 0.4602

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.80163	0.4594

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	15.142	1.6205
U	8	12.731	2.5339

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.22381 df1: 1 df2: 14
P(perm): 0.6348

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.47308	0.6313

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	16.959	1.5405
S	8	15.963	1.4359

PERMDISP – Region C, presence/absence transformed species abundance data.

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 3.0069 df1: 1 df2: 14
P(perm): 0.1457

PAIRWISE COMPARISONS

Groups	t	P(perm)
(U,N-U)	1.734	0.1539

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
U	8	15.042	1.8862
N-U	8	9.551	2.5437

PERMDISP – Region D, presence/absence transformed species abundance data.

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 4.1961 df1: 1 df2: 14
P(perm): 0.0823

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	2.0484	7.87E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	28.719	1.9967
U	8	21.634	2.8243

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 6.12E-2 df1: 1 df2: 14
P(perm): 0.8259

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.24739	0.8215

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	25.094	2.5631
S	8	25.873	1.832

ANOSIM – All sites, presence/absence transformed species abundance data.

Region
Global Test
Sample statistic (Global R): 0.902
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample from a large number)
Number of permuted statistics greater than or equal to Global R: 0

Pairwise Tests

Groups	R Statistic	Significance Level %	Possible Permutations	Actual Permutations	Number >= Observed
B, D	0.95	0.1	300540195	999	0
B, A	0.951	0.1	300540195	999	0
B, C	1	0.1	300540195	999	0
D, A	0.963	0.1	300540195	999	0
D, C	0.475	0.1	300540195	999	0
A, C	0.999	0.1	300540195	999	0

Biogeography
Global Test
Sample statistic (Global R): 0.868
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample from a large number)
Number of permuted statistics greater than or equal to Global R: 0

ANOSIM – Region A, presence/absence transformed species abundance data.

Condition (across Y1)
Global Test
Sample statistic (Global R): 0.62
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Condition (across Y2)
Global Test
Sample statistic (Global R): 1
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

ANOSIM – Region B, presence/absence transformed species abundance data.

Condition
Global Test
Sample statistic (Global R): 0.572
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 0

ANOSIM – Region C, presence/absence transformed species abundance data.

Condition
Global Test
Sample statistic (Global R): 0.226
Significance level of sample statistic: 1.4%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 13

ANOSIM – Region D, presence/absence transformed species abundance data.

Condition
Global Test
Sample statistic (Global R): 0.248
Significance level of sample statistic: 1.4%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 13

Season
Global Test
Sample statistic (Global R): 0.241
Significance level of sample statistic: 1.9%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 18

SIMPER – All sites, presence/absence transformed species abundance data.

Biogeography

Group West

Average similarity: 61.46

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
E.natalensis	1.00	8.77	3.84	14.28	14.28
A.quadrispinosa	1.00	8.77	3.84	14.28	28.55
G.psammodytes	0.94	7.48	2.16	12.17	40.72
E.kensleyi	0.84	5.80	1.41	9.44	50.15
P.latipes	0.81	5.78	1.24	9.41	59.56
E.longicornis	0.75	4.25	1.06	6.92	66.48
T.granulatus	0.66	3.86	0.80	6.28	72.76
Nemertean	0.69	3.66	0.89	5.95	78.72
G.latipes	0.50	2.66	0.56	4.33	83.04
D.serra	0.53	1.87	0.60	3.04	86.08
G.benguellana	0.47	1.37	0.51	2.24	88.31
S.squamata	0.47	1.37	0.51	2.24	90.55

Group South

Average similarity: 63.91

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
E.natalensis	0.97	8.45	3.10	13.22	13.22
P.latipes	0.97	8.31	3.09	13.00	26.22
G.psammodytes	0.94	7.84	2.34	12.27	38.48
E.longicornis	0.94	7.83	2.37	12.26	50.74
B.rhodostoma	0.94	7.71	2.35	12.06	62.80
T.sp. nov	0.75	5.21	1.09	8.15	70.95
D.serra	0.75	4.94	1.08	7.72	78.67
D.sordidus	0.69	4.14	0.90	6.47	85.15
E.longicornis np	0.66	3.49	0.84	5.46	90.60

Groups West & South
Average dissimilarity = 62.56

Species	Group West Av.Abund	Group South Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
A.quadrispinosa	1.00	0.03	4.28	3.40	6.85	6.85
B.rhodostoma	0.03	0.94	4.04	2.56	6.46	13.31
E.kensleyi	0.84	0.00	3.61	2.01	5.77	19.08
T.sp. nov	0.00	0.75	3.40	1.59	5.44	24.52
D.sordidus	0.00	0.69	3.04	1.37	4.86	29.38
T.granulatus	0.66	0.00	2.97	1.27	4.74	34.12
E.longicornis np	0.00	0.66	2.79	1.29	4.46	38.58
Nemertean	0.69	0.31	2.50	1.10	4.00	42.58
G.latipes	0.50	0.03	2.45	0.97	3.92	46.50
D.serra	0.53	0.75	2.29	0.93	3.66	50.17
S.squamata	0.47	0.25	1.95	0.94	3.12	53.29
G.benguellana	0.47	0.00	1.77	0.91	2.82	56.11
N.capense	0.44	0.16	1.76	0.90	2.82	58.93
Cumacean A	0.44	0.09	1.74	0.87	2.78	61.71
B.digitalis	0.41	0.06	1.58	0.82	2.52	64.23
U.coxalis	0.06	0.38	1.57	0.78	2.50	66.74
L.tetraura	0.03	0.34	1.49	0.71	2.39	69.12
Isopod A	0.19	0.28	1.46	0.73	2.33	71.46
E.longicornis	0.75	0.94	1.45	0.61	2.31	73.77
S.capense	0.28	0.19	1.41	0.73	2.26	76.02
G.incerta	0.06	0.28	1.33	0.64	2.13	78.15
Amph A	0.25	0.03	1.30	0.59	2.09	80.24
Bausto sp	0.00	0.28	1.14	0.61	1.82	82.06
P.longimanus	0.09	0.22	1.08	0.59	1.72	83.78
P.herdmani	0.28	0.03	1.03	0.64	1.65	85.44
Orbina B	0.25	0.06	1.03	0.61	1.64	87.08
P.latipes	0.81	0.97	0.92	0.50	1.46	88.54
B.pura	0.00	0.19	0.79	0.47	1.26	89.80
Tylos capensis	0.00	0.16	0.67	0.42	1.07	90.87

Regions
Group B
Average similarity: 74.38

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
D.serra	1.00	6.56	5.67	8.82	8.82
E.kensleyi	1.00	6.56	5.67	8.82	17.64
E.longicornis	1.00	6.56	5.67	8.82	26.47
E.natalensis	1.00	6.56	5.67	8.82	35.29
G.psammodytes	1.00	6.56	5.67	8.82	44.11
A.quadrispinosa	1.00	6.56	5.67	8.82	52.93
G.benguellana	0.94	5.68	2.35	7.64	60.57
S.squamata	0.94	5.68	2.35	7.64	68.21
Nemertean	0.81	4.23	1.30	5.68	73.89
N.capense	0.81	4.01	1.32	5.40	79.29
Cumacean A	0.75	3.28	1.08	4.41	83.69
B.digitalis	0.69	2.70	0.90	3.63	87.32
P.latipes	0.63	2.10	0.77	2.83	90.15

Group D
Average similarity: 59.50

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
P.latipes	1.00	7.89	4.88	13.26	13.26
E.longicornis	0.94	7.01	2.28	11.79	25.05
E.natalensis	0.94	6.98	2.27	11.74	36.79
B.rhodostoma	0.94	6.79	2.28	11.42	48.21
G.psammodytes	0.88	5.90	1.62	9.91	58.12
E.longicornis np	0.81	5.03	1.29	8.46	66.58
U.coxalis	0.63	2.70	0.76	4.54	71.12
T.sp. nov	0.56	2.48	0.64	4.17	75.29
L.tetraura	0.56	2.28	0.63	3.83	79.12
Bausto sp	0.56	2.26	0.65	3.80	82.92
Isopod A	0.56	2.11	0.64	3.54	86.46
Nemertean	0.56	2.07	0.64	3.48	89.94
D.serra	0.50	1.60	0.54	2.69	92.62

Group A
Average similarity: 75.89

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
E.natalensis	1.00	11.67	8.24	15.38	15.38
P.latipes	1.00	11.67	8.24	15.38	30.77
A.quadrispinosa	1.00	11.67	8.24	15.38	46.15
G.latipes	0.94	9.98	2.52	13.15	59.30
T.granulatus	0.88	8.91	1.71	11.74	71.04
G.psammodytes	0.88	8.68	1.71	11.44	82.48
E.kensleyi	0.69	5.17	0.90	6.81	89.29
Nemertean	0.56	3.08	0.65	4.06	93.35

Group C
Average similarity: 79.39

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
D.serra	1.00	10.06	9.13	12.67	12.67
D.sordidus	1.00	10.06	9.13	12.67	25.34
E.natalensis	1.00	10.06	9.13	12.67	38.01
G.psammodytes	1.00	10.06	9.13	12.67	50.68
T.sp. nov	0.94	8.80	2.51	11.09	61.77
P.latipes	0.94	8.74	2.51	11.01	72.78
B.rhodostoma	0.94	8.68	2.53	10.93	83.71
E.longicornis	0.94	8.68	2.53	10.93	94.64

Groups B & D
Average dissimilarity = 61.11

Species	Group B Av.Abund	Group D Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
E.kensleyi	1.00	0.00	3.59	5.09	5.88	5.88
A.quadrispinosa	1.00	0.00	3.59	5.09	5.88	11.75
G.benguellana	0.94	0.00	3.35	3.03	5.48	17.23
B.rhodostoma	0.06	0.94	3.19	2.39	5.22	22.45
E.longicornis np	0.00	0.81	2.89	1.90	4.73	27.19
Cumacean A	0.75	0.19	2.29	1.32	3.75	30.94
N.capense	0.81	0.31	2.26	1.23	3.70	34.63
S.squamata	0.94	0.38	2.24	1.19	3.67	38.31
B.digitalis	0.69	0.13	2.20	1.28	3.60	41.91
U.coxalis	0.13	0.63	2.08	1.17	3.40	45.31
T.sp. nov	0.00	0.56	2.06	1.10	3.38	48.69
L.tetraura	0.00	0.56	1.99	1.08	3.25	51.94
Bausto sp	0.00	0.56	1.98	1.10	3.24	55.18
D.serra	1.00	0.50	1.91	0.96	3.12	58.30
S.capense	0.56	0.19	1.88	1.04	3.08	61.39
Isopod A	0.25	0.56	1.86	1.03	3.04	64.42
P.herdmani	0.56	0.06	1.83	1.08	3.00	67.42
Nemertean	0.81	0.56	1.73	0.89	2.83	70.26
Orbina B	0.50	0.06	1.67	0.97	2.73	72.99
P.latipes	0.63	1.00	1.54	0.76	2.52	75.51
T.granulatus	0.44	0.00	1.41	0.86	2.31	77.82
D.sordidus	0.00	0.38	1.21	0.76	1.98	79.80
Cumacean B (H)	0.38	0.00	1.21	0.76	1.98	81.78
P.longimanus	0.19	0.25	1.14	0.71	1.87	83.65
G.incerta	0.13	0.25	1.07	0.65	1.75	85.41
M.longimana	0.00	0.31	1.06	0.65	1.74	87.15
Orbiniidae A	0.00	0.25	0.77	0.57	1.26	88.41
Tylos capensis	0.00	0.19	0.68	0.47	1.11	89.51
U.pinnata	0.19	0.06	0.67	0.54	1.10	90.62

Groups B & A
Average dissimilarity = 51.37

Species	Group B Av.Abund	Group A Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
D.serra	1.00	0.06	3.95	3.16	7.70	7.70
G.benguellana	0.94	0.00	3.94	3.14	7.66	15.36
S.squamata	0.94	0.00	3.94	3.14	7.66	23.02
G.latipes	0.06	0.94	3.71	2.44	7.22	30.24
N.capense	0.81	0.06	3.16	1.75	6.15	36.38
Cumacean A	0.75	0.13	2.76	1.42	5.37	41.75
B.digitalis	0.69	0.13	2.56	1.29	4.99	46.74
T.granulatus	0.44	0.88	2.48	1.07	4.82	51.56
S.capense	0.56	0.00	2.26	1.10	4.40	55.96
E.longicornis	1.00	0.50	2.21	0.97	4.30	60.26
P.herdmani	0.56	0.00	2.13	1.11	4.15	64.41
Nemertean	0.81	0.56	2.02	0.90	3.93	68.34
Orbina B	0.50	0.00	1.92	0.98	3.74	72.08
Amph A	0.06	0.44	1.90	0.87	3.70	75.78
P.latipes	0.63	1.00	1.85	0.77	3.60	79.38
Cumacean B (H)	0.38	0.00	1.40	0.77	2.72	82.10
E.kensleyi	1.00	0.69	1.36	0.66	2.64	84.74
Isopod A	0.25	0.13	1.24	0.65	2.41	87.16
B.cunctator	0.19	0.06	0.84	0.53	1.63	88.79
Poly Y	0.00	0.19	0.79	0.47	1.54	90.33

Groups D & A
Average dissimilarity = 65.78

Species	Group D Av.Abund	Group A Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
A.quadrispinosa	0.00	1.00	4.73	5.28	7.20	7.20
B.rhodostoma	0.94	0.00	4.40	3.07	6.69	13.88
G.latipes	0.00	0.94	4.40	3.11	6.68	20.57
T.granulatus	0.00	0.88	4.15	2.32	6.31	26.88
E.longicornis np	0.81	0.00	3.80	1.92	5.78	32.66
E.kensleyi	0.00	0.69	3.21	1.40	4.88	37.54
U.coxalis	0.63	0.00	2.79	1.25	4.25	41.79
T.sp. nov	0.56	0.00	2.73	1.10	4.15	45.94
L.tetraura	0.56	0.06	2.59	1.06	3.93	49.87
Bausto sp	0.56	0.00	2.58	1.11	3.92	53.80
E.longicornis	0.94	0.50	2.48	0.96	3.77	57.56
Isopod A	0.56	0.13	2.45	1.07	3.72	61.28
Nemertean	0.56	0.56	2.35	0.96	3.57	64.85
D.serra	0.50	0.06	2.20	0.97	3.34	68.20
Amph A	0.06	0.44	2.12	0.87	3.23	71.42
S.squamata	0.38	0.00	1.66	0.75	2.52	73.94
D.sordidus	0.38	0.00	1.55	0.76	2.35	76.29
M.longimana	0.31	0.00	1.39	0.65	2.11	78.40
N.capense	0.31	0.06	1.36	0.70	2.06	80.46
Cumacean A	0.19	0.13	1.17	0.59	1.78	82.24
G.incerta	0.25	0.00	1.10	0.55	1.67	83.90
G.psammodytes	0.88	0.88	1.08	0.52	1.65	85.55
P.longimanus	0.25	0.00	0.99	0.57	1.50	87.05
Orbiniidae A	0.25	0.00	0.97	0.57	1.47	88.52
B.digitalis	0.13	0.13	0.93	0.52	1.42	89.94
Tylos capensis	0.19	0.00	0.89	0.47	1.36	91.30

Groups B & C
Average dissimilarity = 60.71

Species	Group B Av.Abund	Group C Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
D.sordidus	0.00	1.00	3.99	6.00	6.57	6.57
E.kensleyi	1.00	0.00	3.99	6.00	6.57	13.14
A.quadrispinosa	1.00	0.06	3.74	3.21	6.16	19.30
T.sp. nov	0.00	0.94	3.74	3.21	6.16	25.46
G.benguellana	0.94	0.00	3.72	3.20	6.12	31.58
B.rhodostoma	0.06	0.94	3.55	2.49	5.85	37.44
S.squamata	0.94	0.13	3.33	2.03	5.49	42.93
N.capense	0.81	0.00	3.12	1.96	5.14	48.07
Nemertean	0.81	0.06	3.09	1.74	5.10	53.16
Cumacean A	0.75	0.00	2.82	1.66	4.64	57.80
B.digitalis	0.69	0.00	2.56	1.43	4.22	62.03
S.capense	0.56	0.19	2.09	1.05	3.44	65.46
P.herdmani	0.56	0.00	2.02	1.11	3.34	68.80
E.longicornis np	0.00	0.50	1.91	0.97	3.15	71.94
Orbina B	0.50	0.06	1.84	0.98	3.04	74.98
P.latipes	0.63	0.94	1.77	0.79	2.91	77.89
T.granulatus	0.44	0.00	1.55	0.87	2.55	80.45
G.incerta	0.13	0.31	1.44	0.73	2.38	82.82
Cumacean B (H)	0.38	0.00	1.33	0.77	2.19	85.01
P.longimanus	0.19	0.19	1.19	0.65	1.96	86.97
B.pura	0.00	0.25	0.95	0.57	1.57	88.54
Isopod A	0.25	0.00	0.93	0.56	1.53	90.06

Groups D & C
Average dissimilarity = 41.28

Species	Group D Av.Abund	Group C Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
D.sordidus	0.38	1.00	2.98	1.25	7.21	7.21
U.coxalis	0.63	0.13	2.53	1.18	6.13	13.34
Bausto sp	0.56	0.00	2.43	1.11	5.88	19.22
L.tetraura	0.56	0.13	2.40	1.05	5.80	25.02
D.serra	0.50	1.00	2.39	0.97	5.79	30.81
Isopod A	0.56	0.00	2.33	1.11	5.65	36.46
Nemertean	0.56	0.06	2.30	1.08	5.58	42.04
E.longicornis np	0.81	0.50	2.28	0.97	5.52	47.56
T.sp. nov	0.56	0.94	1.92	0.86	4.66	52.21
G.incerta	0.25	0.31	1.79	0.80	4.33	56.54
S.squamata	0.38	0.13	1.70	0.80	4.12	60.66
P.longimanus	0.25	0.19	1.41	0.71	3.41	64.08
B.pura	0.13	0.25	1.31	0.66	3.18	67.26
M.longimana	0.31	0.00	1.30	0.65	3.16	70.42
S.capense	0.19	0.19	1.23	0.65	2.98	73.40
Tylos capensis	0.19	0.13	1.16	0.59	2.82	76.22
N.capense	0.31	0.00	1.16	0.67	2.81	79.03
Orbiniidae A	0.25	0.00	0.92	0.57	2.23	81.26
Cumacean A	0.19	0.00	0.72	0.48	1.75	83.01
Cirratulid	0.06	0.13	0.70	0.45	1.70	84.72
Emerita	0.19	0.00	0.65	0.48	1.58	86.29
G.psammodytes	0.88	1.00	0.58	0.38	1.41	87.70
B.rhodostoma	0.94	0.94	0.57	0.36	1.39	89.10
E.longicornis	0.94	0.94	0.51	0.36	1.24	90.34

Groups A & C
Average dissimilarity = 62.65

Species	Group A Av.Abund	Group C Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
D.sordidus	0.00	1.00	5.41	8.43	8.63	8.63
A.quadrispinosa	1.00	0.06	5.07	3.48	8.09	16.73
T.sp. nov	0.00	0.94	5.07	3.48	8.09	24.82
D.serra	0.06	1.00	5.06	3.48	8.08	32.90
B.rhodostoma	0.00	0.94	5.03	3.51	8.03	40.93
G.latipes	0.94	0.06	4.75	2.61	7.59	48.52
T.granulatus	0.88	0.00	4.75	2.50	7.57	56.09
E.kensleyi	0.69	0.00	3.66	1.45	5.84	61.93
Nemertean	0.56	0.06	2.84	1.11	4.53	66.47
E.longicornis	0.50	0.94	2.84	0.99	4.53	70.99
E.longicornis np	0.00	0.50	2.56	0.98	4.08	75.07
Amph A	0.44	0.00	2.40	0.87	3.82	78.90
G.incerta	0.00	0.31	1.72	0.67	2.75	81.65
B.pura	0.00	0.25	1.28	0.57	2.04	83.68
Poly Y	0.19	0.00	1.01	0.48	1.61	85.30
P.longimanus	0.00	0.19	0.99	0.48	1.59	86.88
S.capense	0.00	0.19	0.93	0.48	1.48	88.36
L.tetraura	0.06	0.13	0.90	0.45	1.43	89.79
G.psammodytes	0.88	1.00	0.72	0.38	1.15	90.94

SIMPER – Region A, presence/absence transformed species abundance data.

Group N-U
Average similarity: 79.38

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
E.natalensis	1.00	13.21	11.38	16.64	16.64
P.latipes	1.00	13.21	11.38	16.64	33.29
T.granulatus	1.00	13.21	11.38	16.64	49.93
A.quadrispinosa	1.00	13.21	11.38	16.64	66.58
G.latipes	0.88	9.59	1.69	12.08	78.66
G.psammodytes	0.75	7.05	1.05	8.88	87.53
Amph A	0.75	6.72	1.05	8.47	96.01

Group U
Average similarity: 85.78

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
E.kensleyi	1.00	10.31	12.95	12.02	12.02
E.longicornis	1.00	10.31	12.95	12.02	24.05
E.natalensis	1.00	10.31	12.95	12.02	36.07
G.latipes	1.00	10.31	12.95	12.02	48.09
G.psammodytes	1.00	10.31	12.95	12.02	60.11
P.latipes	1.00	10.31	12.95	12.02	72.14
A.quadrispinosa	1.00	10.31	12.95	12.02	84.16
Nemertean	0.88	7.53	1.69	8.78	92.94

Groups N-U & U
Average dissimilarity = 29.97

	Group N-U	Group U				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
E.longicornis	0.00	1.00	5.80	11.26	19.35	19.35
Nemertean	0.25	0.88	4.02	1.46	13.43	32.78
Amph A	0.75	0.13	3.94	1.46	13.13	45.91
E.kensleyi	0.38	1.00	3.54	1.27	11.83	57.74
Poly Y	0.38	0.00	2.05	0.77	6.82	64.57
T.granulatus	1.00	0.75	1.51	0.57	5.05	69.62
G.psammodytes	0.75	1.00	1.46	0.57	4.86	74.48
B.digitalis	0.00	0.25	1.38	0.57	4.62	79.10
Isopod A	0.00	0.25	1.38	0.57	4.62	83.72
Cumacean A	0.13	0.13	1.28	0.52	4.26	87.98
G.latipes	0.88	1.00	0.80	0.37	2.66	90.65

SIMPER – Region B, presence/absence transformed species abundance data.

Group N-U
Average similarity: 77.52

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
D.serra	1.00	7.56	6.72	9.75	9.75
E.kensleyi	1.00	7.56	6.72	9.75	19.51
E.longicornis	1.00	7.56	6.72	9.75	29.26
E.natalensis	1.00	7.56	6.72	9.75	39.02
G.benguellana	1.00	7.56	6.72	9.75	48.77
G.psammodytes	1.00	7.56	6.72	9.75	58.52
S.squamata	1.00	7.56	6.72	9.75	68.28
A.quadrispinosa	1.00	7.56	6.72	9.75	78.03
Nemertean	0.75	4.14	1.04	5.33	83.37
Cumacean A	0.75	3.69	1.04	4.77	88.13
N.capense	0.75	3.69	1.04	4.77	92.90

Group U
Average similarity: 79.73

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
D.serra	1.00	5.68	7.65	7.13	7.13
E.kensleyi	1.00	5.68	7.65	7.13	14.25
E.longicornis	1.00	5.68	7.65	7.13	21.38
E.natalensis	1.00	5.68	7.65	7.13	28.51
G.psammodytes	1.00	5.68	7.65	7.13	35.64
Orbina B	1.00	5.68	7.65	7.13	42.76
A.quadrispinosa	1.00	5.68	7.65	7.13	49.89
N.capense	0.88	4.20	1.64	5.27	55.16
Nemertean	0.88	4.20	1.64	5.27	60.43
G.benguellana	0.88	4.08	1.66	5.12	65.55
S.squamata	0.88	4.08	1.66	5.12	70.68
T.granulatus	0.88	4.08	1.66	5.12	75.80
P.herdmani	0.88	4.08	1.66	5.12	80.92
P.latipes	0.88	4.08	1.66	5.12	86.04
S.capense	0.75	3.03	1.04	3.80	89.84
B.digitalis	0.75	2.85	1.04	3.57	93.42

Groups N-U & U
Average dissimilarity = 29.33

Species	Group N-U Av.Abund	Group U Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Orbina B	0.00	1.00	3.25	6.65	11.10	11.10
T.granulatus	0.00	0.88	2.78	2.45	9.47	20.56
P.herdmani	0.25	0.88	2.25	1.43	7.68	28.25
P.latipes	0.38	0.88	2.00	1.18	6.81	35.06
S.capense	0.38	0.75	1.85	1.10	6.30	41.36
B.digitalis	0.63	0.75	1.49	0.87	5.08	46.44
Cumacean B (H)	0.38	0.38	1.45	0.92	4.96	51.40
Cumacean A	0.75	0.75	1.32	0.76	4.51	55.91
Isopod A	0.13	0.38	1.26	0.80	4.29	60.19
B.cunctator	0.00	0.38	1.15	0.76	3.92	64.11
P.longimanus	0.38	0.00	1.11	0.76	3.78	67.89
U.pinnata	0.00	0.38	1.11	0.76	3.78	71.66
N.capense	0.75	0.88	1.10	0.66	3.74	75.41
Nemertean	0.75	0.88	1.01	0.66	3.45	78.85
G.incerta	0.00	0.25	0.85	0.56	2.91	81.76
B.laevissima	0.25	0.00	0.75	0.57	2.54	84.30
U.coxalis	0.00	0.25	0.72	0.57	2.46	86.76
Ovalipes	0.13	0.13	0.62	0.52	2.11	88.87
G.benguellana	1.00	0.88	0.48	0.37	1.63	90.50

SIMPER – Region C, presence/absence transformed species abundance data.

Group U
Average similarity: 77.17

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
B.rhodostoma	1.00	9.30	9.06	12.05	12.05
D.serra	1.00	9.30	9.06	12.05	24.11
D.sordidus	1.00	9.30	9.06	12.05	36.16
E.longicornis	1.00	9.30	9.06	12.05	48.22
E.natalensis	1.00	9.30	9.06	12.05	60.27
G.psammodytes	1.00	9.30	9.06	12.05	72.32
T.sp. nov	0.88	6.90	1.66	8.94	81.27
P.latipes	0.88	6.80	1.67	8.81	90.08

Group N-U
Average similarity: 85.60

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
D.serra	1.00	10.86	14.35	12.69	12.69
D.sordidus	1.00	10.86	14.35	12.69	25.38
E.natalensis	1.00	10.86	14.35	12.69	38.07
G.psammodytes	1.00	10.86	14.35	12.69	50.75
P.latipes	1.00	10.86	14.35	12.69	63.44
T.sp. nov	1.00	10.86	14.35	12.69	76.13
B.rhodostoma	0.88	7.99	1.69	9.33	85.46
E.longicornis	0.88	7.99	1.69	9.33	94.79

Groups U & N-U
Average dissimilarity = 22.36

Species	Group U Av.Abund	Group N-U Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
G.incerta	0.00	0.63	3.08	1.27	13.78	13.78
E.longicornis np	0.75	0.25	3.06	1.27	13.70	27.47
B.pura	0.38	0.13	1.95	0.81	8.73	36.20
S.capense	0.38	0.00	1.80	0.77	8.04	44.24
P.longimanus	0.25	0.13	1.58	0.66	7.08	51.32
Tylos capensis	0.25	0.00	1.23	0.57	5.48	56.80
U.coxalis	0.25	0.00	1.21	0.57	5.40	62.21
L.tetraura	0.00	0.25	1.21	0.57	5.40	67.60
S.squamata	0.25	0.00	1.13	0.57	5.05	72.65
Cirratulid	0.13	0.13	1.01	0.52	4.52	77.17
P.latipes	0.88	1.00	0.69	0.37	3.07	80.24
B.rhodostoma	1.00	0.88	0.67	0.37	2.99	83.23
E.longicornis	1.00	0.88	0.67	0.37	2.99	86.22
Orbina B	0.13	0.00	0.65	0.37	2.91	89.13
A.quadrispinosa	0.13	0.00	0.65	0.37	2.91	92.04

SIMPER – Region D, presence/absence transformed species abundance data.

Condition
Group N-U
Average similarity: 57.38

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
B.rhodostoma	1.00	8.18	3.86	14.26	14.26
E.longicornis	1.00	8.18	3.86	14.26	28.52
G.psammodytes	1.00	8.18	3.86	14.26	42.78
P.latipes	1.00	8.18	3.86	14.26	57.04
E.natalensis	0.88	6.32	1.50	11.02	68.06
E.longicornis np	0.75	4.09	1.00	7.12	75.18
L.tetraura	0.63	2.68	0.69	4.68	79.86
T.sp. nov	0.50	2.03	0.51	3.54	83.40
M.longimana	0.50	1.53	0.50	2.66	86.06
S.squamata	0.50	1.38	0.50	2.41	88.47
Nemertean	0.50	1.35	0.50	2.36	90.82

Group U
Average similarity: 66.92

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Bausto sp	1.00	7.58	8.41	11.32	11.32
E.natalensis	1.00	7.58	8.41	11.32	22.64
P.latipes	1.00	7.58	8.41	11.32	33.97
E.longicornis	0.88	5.84	1.66	8.73	42.70
E.longicornis np	0.88	5.84	1.66	8.73	51.43
U.coxalis	0.88	5.84	1.66	8.73	60.16
B.rhodostoma	0.88	5.47	1.67	8.17	68.32
Isopod A	0.75	4.07	1.04	6.08	74.40
G.psammodytes	0.75	3.87	1.04	5.79	80.19
D.serra	0.63	2.75	0.72	4.11	84.30
T.sp. nov	0.63	2.64	0.73	3.95	88.25
Nemertean	0.63	2.62	0.72	3.92	92.17

Groups N-U & U
Average dissimilarity = 42.82

Species	Group N-U Av.Abund	Group U Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Bausto sp	0.13	1.00	3.49	2.26	8.15	8.15
U.coxalis	0.38	0.88	2.54	1.15	5.92	14.07
Isopod A	0.38	0.75	2.34	1.08	5.45	19.53
D.sordidus	0.13	0.63	2.25	1.16	5.26	24.79
D.serra	0.38	0.63	2.18	1.01	5.09	29.88
Nemertean	0.50	0.63	2.03	0.96	4.73	34.61
L.tetraura	0.63	0.50	1.97	0.95	4.61	39.22
T.sp. nov	0.50	0.63	1.94	0.95	4.54	43.76
M.longimana	0.50	0.13	1.88	0.95	4.40	48.16
S.squamata	0.50	0.25	1.88	0.95	4.38	52.54
N.capense	0.50	0.13	1.72	0.98	4.01	56.56
G.incerta	0.38	0.13	1.51	0.78	3.53	60.08
Orbiniidae A	0.38	0.13	1.38	0.81	3.21	63.29
Cumacean A	0.00	0.38	1.33	0.75	3.10	66.40
P.longimanus	0.25	0.25	1.33	0.75	3.10	69.50
E.longicornis np	0.75	0.88	1.28	0.65	3.00	72.50
Tylos capensis	0.25	0.13	1.23	0.65	2.87	75.37
S.capense	0.25	0.13	1.08	0.66	2.53	77.90
G.psammodytes	1.00	0.75	1.06	0.56	2.47	80.37
Emerita	0.25	0.13	1.01	0.66	2.37	82.74
B.pura	0.13	0.13	0.79	0.52	1.84	84.57
B.digitalis	0.13	0.13	0.78	0.51	1.82	86.40
B.rhodostoma	1.00	0.88	0.57	0.37	1.32	87.72
Syllidae	0.13	0.00	0.54	0.37	1.26	88.98
Decapod juv	0.13	0.00	0.46	0.37	1.07	90.06

Season
Group W
Average similarity: 62.20

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
E.natalensis	1.00	9.56	5.99	15.37	15.37
P.latipes	1.00	9.56	5.99	15.37	30.73
E.longicornis	0.88	7.62	1.65	12.26	42.99
G.psammodytes	0.88	7.22	1.61	11.60	54.59
B.rhodostoma	0.88	7.12	1.61	11.44	66.04
E.longicornis np	0.75	5.15	1.04	8.29	74.32
T.sp. nov	0.75	4.76	1.03	7.65	81.97
L.tetraura	0.63	3.24	0.71	5.20	87.17
Nemertean	0.50	1.74	0.51	2.80	89.97
Bausto sp	0.50	1.70	0.51	2.73	92.70

Group S
Average similarity: 61.21

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
B.rhodostoma	1.00	6.51	7.64	10.63	10.63
E.longicornis	1.00	6.51	7.64	10.63	21.27
P.latipes	1.00	6.51	7.64	10.63	31.90
Isopod A	0.88	4.99	1.65	8.16	40.06
U.coxalis	0.88	4.99	1.65	8.16	48.21
E.natalensis	0.88	4.86	1.64	7.94	56.16
E.longicornis np	0.88	4.81	1.64	7.87	64.02
G.psammodytes	0.88	4.71	1.66	7.70	71.72
Bausto sp	0.63	2.57	0.73	4.20	75.92
D.serra	0.63	2.19	0.72	3.57	79.49
Nemertean	0.63	2.16	0.72	3.52	83.02
N.capense	0.63	2.10	0.73	3.43	86.44
D.sordidus	0.50	1.32	0.51	2.16	88.60
L.tetraura	0.50	1.30	0.51	2.13	90.72

Groups W & S
Average dissimilarity = 42.43

	Group W	Group S				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Isopod A	0.25	0.88	2.73	1.42	6.44	6.44
U.coxalis	0.38	0.88	2.37	1.16	5.57	12.01
N.capense	0.00	0.63	2.28	1.25	5.37	17.38
T.sp. nov	0.75	0.38	2.13	1.09	5.02	22.40
D.serra	0.38	0.63	2.06	1.03	4.85	27.25
Bausto sp	0.50	0.63	2.00	0.96	4.71	31.96
Nemertean	0.50	0.63	1.96	0.98	4.62	36.58
L.tetraura	0.63	0.50	1.96	0.97	4.61	41.19
D.sordidus	0.25	0.50	1.91	0.97	4.49	45.69
Orbiniidae A	0.00	0.50	1.80	0.97	4.25	49.94
S.squamata	0.38	0.38	1.77	0.92	4.17	54.11
M.longimana	0.38	0.25	1.63	0.86	3.85	57.95
P.longimanus	0.13	0.38	1.48	0.81	3.49	61.44
S.capense	0.00	0.38	1.39	0.75	3.27	64.71
G.incerta	0.25	0.25	1.38	0.75	3.25	67.95
Emerita	0.00	0.38	1.28	0.76	3.01	70.96
Tylos capensis	0.13	0.25	1.25	0.66	2.94	73.90
E.longicornis np	0.75	0.88	1.22	0.65	2.87	76.77
Cumacean A	0.13	0.25	1.15	0.66	2.71	79.48
B.pura	0.00	0.25	0.97	0.57	2.28	81.75
B.digitalis	0.00	0.25	0.94	0.56	2.22	83.97
G.psammodytes	0.88	0.88	0.90	0.52	2.11	86.08
Decapod juv	0.00	0.13	0.51	0.37	1.20	87.29
P.herdmani	0.00	0.13	0.51	0.37	1.20	88.49
B.rhodostoma	0.88	1.00	0.49	0.37	1.17	89.66
Syllidae	0.13	0.00	0.49	0.37	1.17	90.82

PERMANOVA – All sites, 4th root transformed order abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1505.1	1505.1	7.4974	0.0797	800
Se	1	964.06	964.06	0.88092	0.4987	801
Co	1	986.95	986.95	1.0005	0.4226	799
Bi	1	15499	15499	1.9855	0.3347	3
Re(Bi)	2	15613	7806.3	36.301	0.0001	9937
YexSe	1	651.42	651.42	3.4334	0.1385	7165
YexCo	1	278.93	278.93	1.9762	0.2491	7167
YexBi	1	555.03	555.03	2.7648	0.1782	800
SexCo	1	220.88	220.88	0.47115	0.506	7153
SexBi	1	126.99	126.99	0.11604	0.824	800
CoxBi	1	1429.8	1429.8	1.4494	0.3182	799
YexRe(Bi)	2	401.5	200.75	0.93354	0.5067	9948
SexRe(Bi)	2	2188.8	1094.4	5.0891	0.0001	9947
CoxRe(Bi)	2	1972.9	986.47	4.5873	0.0001	9934
YexSexCo	1	195.22	195.22	0.81143	0.4648	9539
YexSexBi	1	525.97	525.97	2.7722	0.1675	7190
YexCoxBi	1	427.23	427.23	3.0269	0.1529	7205
SexCoxBi	1	435.93	435.93	0.92989	0.4522	7203
YexSexRe(Bi)	2	379.46	189.73	0.88229	0.551	9943
YexCoxRe(Bi)	2	282.29	141.15	0.65636	0.7243	9941
SexCoxRe(Bi)	2	937.6	468.8	2.18	0.0312	9943
YexSexCoxBi	1	78.781	78.781	0.32746	0.649	9502
YexSexCoxRe(Bi)	2	481.17	240.58	1.1188	0.3694	9943
Res	32	6881.4	215.04			
Total	63	53019				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	40.761	6.3845
S(Se)	-4.0726	-2.0181
S(Co)	1.5181E-2	0.12321
S(Bi)	240.4	15.505
V(Re(Bi))	474.45	21.782
S(YexSe)	28.855	5.3717
S(YexCo)	8.6116	2.9346
S(YexBi)	22.142	4.7056
S(SexCo)	-15.495	-3.9364
S(SexBi)	-60.462	-7.7757
S(CoxBi)	27.708	5.2639
V(YexRe(Bi))	-1.7864	-1.3366
V(SexRe(Bi))	109.92	10.484
V(CoxRe(Bi))	96.428	9.8198
S(YexSexCo)	-5.6709	-2.3814
S(YexSexBi)	42.029	6.483
S(YexCoxBi)	35.761	5.98
S(SexCoxBi)	-4.1086	-2.027
V(YexSexRe(Bi))	-6.3279	-2.5155
V(YexCoxRe(Bi))	-18.474	-4.2982
V(SexCoxRe(Bi))	63.44	7.9649
S(YexSexCoxBi)	-40.451	-6.3601
V(YexSexCoxRe(Bi))	12.77	3.5736
V(Res)	215.04	14.664

PERMANOVA – Region A, 4th root transformed order abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	387.1	387.1	3.2756	0.0228	9925
Se	1	312.13	312.13	2.6413	0.0453	9920
Co	1	1321.8	1321.8	11.185	0.001	9929
YexSe	1	310.76	310.76	2.6297	0.058	9920
YexCo	1	194.13	194.13	1.6427	0.1895	9942
SexCo	1	208.45	208.45	1.7639	0.1366	9919
YexSexCo	1	44.932	44.932	0.38021	0.8034	9925
Res	8	945.41	118.18			
Total	15	3724.7				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	33.616	5.7979
S(Se)	24.245	4.9239
S(Co)	150.45	12.266
S(YexSe)	48.147	6.9388
S(YexCo)	18.989	4.3576
S(SexCo)	22.567	4.7505
S(YexSexCo)	-36.622	-6.0516
V(Res)	118.18	10.871

PERMANOVA – Region B, 4th root transformed order abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1381	1381	11.113	0.0014	9921
Se	1	782.53	782.53	6.297	0.0044	9929
Co	1	1796.9	1796.9	14.459	0.0003	9905
YexSe	1	561.76	561.76	4.5204	0.0065	9928
YexCo	1	-12.706	-12.706	Negative		
SexCo	1	180.33	180.33	1.4511	0.2664	9930
YexSexCo	1	214.62	214.62	1.7271	0.2022	9940
Res	8	994.17	124.27			
Total	15	5898.6				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	157.09	12.534
S(Se)	82.283	9.071
S(Co)	209.07	14.459
S(YexSe)	109.37	10.458
S(YexCo)	-34.244	-5.8519
S(SexCo)	14.015	3.7437
S(YexSexCo)	45.176	6.7213
V(Res)	124.27	11.148

PERMANOVA (pairwise– Region B, 4th root transformed order abundance data.

Term 'YexSe' for pairs of levels of factor 'Season'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	2.8311	0.0318	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	88.786	
S	83.579	87.24

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	1.9773	0.0434	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	84.236	
S	73.168	75.937

Term 'YexSe' for pairs of levels of factor 'Season'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	2.8442	0.0318	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	74.219	
S	69.615	80.672

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	1.3509	0.1926	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	77.731	
S	79.138	78.38

PERMANOVA – Region C, 4th root transformed order abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	363.94	363.94	2.775	0.0636	9934
Se	1	755	755	5.7569	0.0031	9922
Co	1	256.66	256.66	1.957	0.1464	9919
YexSe	1	453.52	453.52	3.458	0.0269	9926
YexCo	1	334.03	334.03	2.547	0.0723	9940
SexCo	1	-12.505	-12.505	Negative		
YexSexCo	1	136.17	136.17	1.0383	0.3997	9928
Res	8	1049.2	131.15			
Total	15	3336				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	29.099	5.3943
S(Se)	77.982	8.8307
S(Co)	15.689	3.961
S(YexSe)	80.592	8.9773
S(YexCo)	50.72	7.1218
S(SexCo)	-35.913	-5.9928
S(YexSexCo)	2.5115	1.5848
V(Res)	131.15	11.452

PERMANOVA (Pairwise) – Region C, 4th root transformed order abundance data.

Term 'YexSe' for pairs of levels of factor 'Year'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms	P(MC)
1, 2	0.75921	0.69	268	0.6451

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	88.786	
2	87.232	84.236

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms	P(MC)
1, 2	2.1225	0.0595	270	0.0588

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	87.24	
2	75.099	75.937

Term 'YexSe' for pairs of levels of factor 'Season'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	2.8311	0.0318	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	88.786	
S	83.579	87.24

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	1.9773	0.0434	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	84.236	
S	73.168	75.937

PERMANOVA – Region D, 4th root transformed order abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	329.59	329.59	0.67738	0.6281	9929
Se	1	1430.1	1430.1	2.9392	0.034	9920
Co	1	1014.4	1014.4	2.0847	0.0944	9930
YexSe	1	230.81	230.81	0.47435	0.7632	9935
YexCo	1	473	473	0.9721	0.4412	9908
SexCo	1	1218.1	1218.1	2.5035	0.047	9925
YexSexCo	1	359.44	359.44	0.73871	0.5745	9930
Res	8	3892.6	486.57			
Total	15	8948.1				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-19.623	-4.4297
S(Se)	117.94	10.86
S(Co)	65.976	8.1225
S(YexSe)	-63.942	-7.9964
S(YexCo)	-3.394	-1.8423
S(SexCo)	182.89	13.524
S(YexSexCo)	-63.569	-7.973
V(Res)	486.57	22.058

PERMANOVA (Pairwise) – Region D, 4th root transformed order abundance data.

Term 'SexCo' for pairs of levels of factor 'Season'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	2.361	0.028	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	70.182	
S	61.171	76.188

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	1.0875	0.3421	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	69.537	
S	67.692	69.793

Term 'SexCo' for pairs of levels of factor 'Condition'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	1.6753	0.057	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	70.182	
U	63.044	69.537

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	1.3273	0.1533	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	76.188	
U	68.806	69.793

PERMDISP – Region A, 4th root transformed order abundance data.

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.29334 df1: 1 df2: 14
P(perm): 0.6264

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.54161	0.6274

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	14.382	1.4502
2	8	13.115	1.8372

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.40166 df1: 1 df2: 14
P(perm): 0.5786

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.63377	0.5835

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	14.744	1.0296
S	8	13.503	1.6658

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 1.6306 df1: 1 df2: 14
P(perm): 0.1953

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	1.277	0.2018

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	12.876	1.4952
U	8	10.575	1.0065

PERMDISP – Region B, 4th root transformed order abundance data.

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 3.8866 df1: 1 df2: 14
P(perm): 0.0976

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	1.9714	9.7E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	17.605	2.1697
U	8	12.439	1.4691

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 3.1322 df1: 1 df2: 14
P(perm): 0.0976

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	1.7698	9.38E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	18.026	1.8453
2	8	14.625	0.53788

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 4.0603 df1: 1 df2: 14
P(perm): 0.0478

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	2.015	5.52E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	19.258	1.5643
S	8	15.716	0.8015

PERMDISP – Region C, 4th root transformed order abundance data.

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 13.441 df1: 1 df2: 14
P(perm): 0.0087

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	3.6662	9.2E-3

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	8.7466	0.76382
S	8	15.021	1.5314

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 15.887 df1: 1 df2: 14
P(perm): 0.0032

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	3.9858	4.1E-3

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	9.6968	1.2136
2	8	16.105	1.0547

PERMDISP – Region D, 4th root transformed order abundance data.

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 1.556 df1: 1 df2: 14
P(perm): 0.2345

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	1.2474	0.2292

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	22.666	1.7727
S	8	19.561	1.7471

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 1.0261 df1: 1 df2: 14
P(perm): 0.2717

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	1.0129	0.2815

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	22.814	0.77004
U	8	21.384	1.1834

ANOSIM – Region A, 4th root transformed order abundance data.

Condition
Global Test
Sample statistic (Global R): 0.554
Significance level of sample statistic: 0.2%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 1

ANOSIM – Region B, 4th root transformed order abundance data.

Condition
Global Test
Sample statistic (Global R): 0.513
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 0

Season (across Y1)
Global Test
Sample statistic (Global R): 0.563
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Year (across Winter)
Global Test
Sample statistic (Global R): 0.521
Significance level of sample statistic: 5.7%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 2

Year (across Summer)
Global Test
Sample statistic (Global R): 0.542
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

ANOSIM – Region C, 4th root transformed order abundance data.

Season (across Y1)
Global Test
Sample statistic (Global R): 0.427
Significance level of sample statistic: 8.6%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 3

Season (across Y2)
Global Test
Sample statistic (Global R): 0.625
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

ANOSIM – Region D, 4th root transformed order abundance data.

Season (across Non-upwelling)
Global Test
Sample statistic (Global R): 0.885
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

SIMPER – Region A, 4th root transformed order abundance data.

Group N-U
Average similarity: 80.69

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Isopoda	4.18	37.24	6.24	46.15	46.15
Amphipoda	4.06	35.79	6.69	44.36	90.51

Group U
Average similarity: 84.04

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Amphipoda	4.39	31.48	13.76	37.46	37.46
Isopoda	3.59	26.10	12.81	31.06	68.52
Mysidae	2.66	17.10	3.96	20.34	88.87
Nemertea	1.56	9.08	1.59	10.80	99.67

Groups N-U & U
Average dissimilarity = 24.28

Species	Group N-U Av.Abund	Group U Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mysidae	1.16	2.66	6.76	1.56	27.84	27.84
Nemertea	0.27	1.56	5.85	1.90	24.09	51.93
Isopoda	4.18	3.59	3.23	1.22	13.32	65.25
Amphipoda	4.06	4.39	2.98	1.20	12.27	77.52
Polychaetea	0.40	0.00	1.60	0.76	6.58	84.09
Neogastropoda	0.00	0.27	1.18	0.57	4.86	88.96
Cumacea	0.13	0.13	0.95	0.52	3.91	92.87

SIMPER – Region B, 4th root transformed order abundance data.

Group N-U
Average similarity: 73.53

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Isopoda	3.46	15.23	5.07	20.71	20.71
Amphipoda	2.68	11.77	5.07	16.01	36.72
Veneroida	2.76	10.31	3.07	14.02	50.74
Spionida	2.52	8.11	2.83	11.03	61.77
Phyllodocida	1.91	7.78	8.14	10.59	72.36
Mysidae	1.76	7.24	3.10	9.85	82.21
Nemertea	2.68	6.42	0.96	8.73	90.93

Group U
Average similarity: 81.12

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Isopoda	4.41	16.82	6.80	20.74	20.74
Mysidae	3.98	13.93	7.55	17.17	37.91
Amphipoda	3.34	12.29	7.67	15.15	53.06
Veneroida	3.09	10.30	4.74	12.70	65.75
Phyllodocida	1.86	6.46	6.45	7.96	73.71
Polychaetea	1.84	5.82	4.25	7.17	80.88
Spionida	1.96	4.89	1.58	6.02	86.91
Cumacea	2.14	4.42	1.02	5.45	92.36

Groups N-U & U
Average dissimilarity = 30.19

Species	Group N-U Av.Abund	Group U Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Mysidae	1.76	3.98	4.76	2.64	15.77	15.77
Nemertea	2.68	1.18	4.48	1.63	14.84	30.62
Polychaetea	0.00	1.84	4.01	3.35	13.28	43.90
Cumacea	1.66	2.14	3.37	1.32	11.16	55.06
Spionida	2.52	1.96	2.99	1.34	9.89	64.95
Neogastropoda	1.29	1.34	2.54	1.36	8.42	73.37
Veneroida	2.76	3.09	2.35	1.25	7.79	81.16
Isopoda	3.46	4.41	2.23	1.59	7.37	88.54
Amphipoda	2.68	3.34	1.65	1.54	5.47	94.01

PERMANOVA – All sites, 4th root transformed phylum abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1013.5	1013.5	6.4896	0.0848	799
Se	1	276.07	276.07	0.59627	0.573	801
Co	1	483.06	483.06	0.66787	0.5688	801
Bi	1	15066	15066	2.4265	0.3449	3
Re(Bi)	2	12418	6208.8	55.378	0.0001	9959
YexSe	1	691.13	691.13	9.8166	0.0563	7221
YexCo	1	-152.58	-152.58	Negative		
YexBi	1	364.21	364.21	2.332	0.187	800
SexCo	1	150.36	150.36	0.48359	0.579	7180
SexBi	1	-116.69	-116.69	Negative		
CoxBi	1	-9.9705	-9.9705	Negative		
YexRe(Bi)	2	312.35	156.17	1.393	0.3162	9966
SexRe(Bi)	2	926	463	4.1296	0.0104	9965
CoxRe(Bi)	2	1446.6	723.29	6.4512	0.0012	9969
YexSexCo	1	167.5	167.5	1.0263	0.4398	9551
YexSexBi	1	260.26	260.26	3.6966	0.1486	7167
YexCoxBi	1	837.09	837.09	9.643	0.0514	7138
SexCoxBi	1	62.337	62.337	0.20049	0.748	7163
YexSexRe(Bi)	2	140.81	70.404	0.62796	0.6022	9971
YexCoxRe(Bi)	2	173.62	86.809	0.77427	0.5414	9973
SexCoxRe(Bi)	2	621.84	310.92	2.7732	0.0736	9962
YexSexCoxBi	1	59.307	59.307	0.36338	0.6389	9505
YexSexCoxRe(Bi)	2	326.42	163.21	1.4557	0.2892	9971
Res	32	3587.7	112.12			
Total	63	39104				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	26.792	5.1761
S(Se)	-5.8415	-2.4169
S(Co)	-7.5071	-2.7399
S(Bi)	276.78	16.637
V(Re(Bi))	381.04	19.52
S(YexSe)	38.795	6.2286
S(YexCo)	-14.962	-3.868
S(YexBi)	13.002	3.6058
S(SexCo)	-10.035	-3.1678
S(SexBi)	-36.231	-6.0192
S(CoxBi)	-45.829	-6.7697
V(YexRe(Bi))	5.5072	2.3467
V(SexRe(Bi))	43.86	6.6227
V(CoxRe(Bi))	76.396	8.7405
S(YexSexCo)	0.53609	0.73218
S(YexSexBi)	23.732	4.8715
S(YexCoxBi)	93.786	9.6843
S(SexCoxBi)	-31.073	-5.5743
V(YexSexRe(Bi))	-10.428	-3.2293
V(YexCoxRe(Bi))	-6.327	-2.5153
V(SexCoxRe(Bi))	49.701	7.0499
S(YexSexCoxBi)	-25.975	-5.0966
V(YexSexCoxRe(Bi))	25.546	5.0543
V(Res)	112.12	10.589

PERMANOVA – Region A, 4th root transformed phylum abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	445.13	445.13	5.1662	0.0354	9930
Se	1	-130.84	-130.84	Negative		
Co	1	906.47	906.47	10.521	0.0019	9939
YexSe	1	435.37	435.37	5.053	0.0293	9934
YexCo	1	266.76	266.76	3.0961	0.0909	9941
SexCo	1	367.13	367.13	4.2609	0.0277	9934
YexSexCo	1	-5.7847	-5.7847	Negative		
Res	8	689.29	86.162			
Total	15	2973.5				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	44.871	6.6986
S(Se)	-27.126	-5.2082
S(Co)	102.54	10.126
S(YexSe)	87.303	9.3436
S(YexCo)	45.15	6.7194
S(SexCo)	70.241	8.381
S(YexSexCo)	-45.973	-6.7803
V(Res)	86.162	9.2823

PERMANOVA (Pairwise) – Region A, 4th root transformed phylum abundance data.

Term 'SexCo' for pairs of levels of factor 'Season'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	1.5972	0.1199	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	91.089	
S	85.189	80.883

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	0.95228	0.5475	269

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	83.153	
S	83.225	82.994

Term 'SexCo' for pairs of levels of factor 'Condition'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	3.456	0.0376	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	91.089	
U	75.025	83.153

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	1.734	0.1381	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	80.883	
U	80.96	82.994

PERMANOVA – Region B, 4th root transformed phylum abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1090.3	1090.3	13.009	0.0038	9928
Se	1	321.66	321.66	3.8379	0.0451	9933
Co	1	756.25	756.25	9.0233	0.003	9931
YexSe	1	336.81	336.81	4.0186	0.0391	9941
YexCo	1	196.12	196.12	2.34	0.1515	9934
SexCo	1	101.54	101.54	1.2116	0.3774	9942
YexSexCo	1	230.76	230.76	2.7534	0.1154	9946
Res	8	670.49	83.811			
Total	15	3703.9				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	125.81	11.216
S(Se)	29.731	5.4527
S(Co)	84.055	9.1682
S(YexSe)	63.249	7.9529
S(YexCo)	28.077	5.2988
S(SexCo)	4.4331	2.1055
S(YexSexCo)	73.476	8.5718
V(Res)	83.811	9.1549

PERMANOVA (pairwise) – Region B, 4th root transformed phylum abundance data.

Term 'YexSe' for pairs of levels of factor 'Year'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
1, 2	2.9598	0.0434	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	79.961	
2	75.088	80.967

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
1, 2	2.8645	0.0311	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	88.154	
2	78.446	83.113

Term 'YexSe' for pairs of levels of factor 'Season'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	2.6235	0.0411	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	79.961	
S	78.337	88.154

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	0.61704	0.6485	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	80.967	
S	84.483	83.113

PERMANOVA – Region C, 4th root transformed phylum abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	127.02	127.02	1.1612	0.3336	9936
Se	1	184.58	184.58	1.6874	0.2144	9940
Co	1	132.89	132.89	1.2149	0.3219	9936
YexSe	1	224.77	224.77	2.0548	0.1632	9931
YexCo	1	362.42	362.42	3.3132	0.0933	9935
SexCo	1	-15.183	-15.183	Negative		
YexSexCo	1	119.28	119.28	1.0904	0.3644	9949
Res	8	875.09	109.39			
Total	15	2010.9				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	2.2036	1.4844
S(Se)	9.3987	3.0657
S(Co)	2.938	1.7141
S(YexSe)	28.846	5.3708
S(YexCo)	63.259	7.9535
S(SexCo)	-31.142	-5.5805
S(YexSexCo)	4.9452	2.2238
V(Res)	109.39	10.459

PERMANOVA – Region D, 4th root transformed phylum abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	27.643	27.643	0.16347	0.7931	9919
Se	1	709.98	709.98	4.1984	0.0221	9941
Co	1	124.05	124.05	0.73354	0.4687	9930
YexSe	1	95.244	95.244	0.56322	0.562	9939
YexCo	1	32.831	32.831	0.19414	0.7768	9923
SexCo	1	381.04	381.04	2.2533	0.147	9941
YexSexCo	1	208.97	208.97	1.2357	0.3154	9933
Res	8	1352.9	169.11			
Total	15	2932.6				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-17.683	-4.2051
S(Se)	67.609	8.2225
S(Co)	-5.6325	-2.3733
S(YexSe)	-18.466	-4.2972
S(YexCo)	-34.069	-5.8369
S(SexCo)	52.984	7.279
S(YexSexCo)	19.93	4.4643
V(Res)	169.11	13.004

PERMDISP – Region A, 4th root transformed phylum abundance data.

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.11635 df1: 1 df2: 14
P(perm): 0.7269

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.3411	0.7216

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	11.684	1.4274
2	8	12.353	1.346

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.25512 df1: 1 df2: 14
P(perm): 0.5698

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.50509	0.5792

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	13.999	1.014
S	8	13.184	1.257

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 7.1715E-2 df1: 1 df2: 14
P(perm): 0.8052

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.2678	0.8043

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	10.024	1.3662
U	8	10.695	2.099

PERMDISP – Region B, 4th root transformed phylum abundance data.

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 6.2892 df1: 1 df2: 14
P(perm): 0.0336

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	2.5078	3.34E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	15.497	2.1452
U	8	9.0813	1.3941

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 2.1364 df1: 1 df2: 14
P(perm): 0.1657

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	1.4616	0.1732

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	15.427	1.7397
S	8	12.577	0.88095

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.53642 df1: 1 df2: 14
P(perm): 0.5003

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.7324	0.5071

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	12.935	1.8276
2	8	11.484	0.76778

PERMDISP – Region D, 4th root transformed phylum abundance data.

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 5.3542E-3 df1: 1 df2: 14
P(perm): 0.9449

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	7.3173E-2	0.9447

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	11.13	1.6212
S	8	10.97	1.4747

ANOSIM – Region A, 4th root transformed phylum abundance data.

Condition (across Winter)
Global Test
Sample statistic (Global R): 0.854
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

ANOSIM – Region B, 4th root transformed phylum abundance data.

Condition
Global Test
Sample statistic (Global R): 0.335
Significance level of sample statistic: 0.4%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 3

Season (across Y1)
Global Test
Sample statistic (Global R): 0.396
Significance level of sample statistic: 5.7%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 2

Year (across Winter)
Global Test
Sample statistic (Global R): 0.365
Significance level of sample statistic: 11.4%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 4

Year (across Summer)
Global Test
Sample statistic (Global R): 0.76
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

SIMPER – Region A, 4th root transformed phylum abundance data.

Examines Condition groups
(across all Season groups)
Group N-U
Average similarity: 85.99

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Crustacea	5.03	83.69	8.77	97.32	97.32

Group U
Average similarity: 83.07

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Crustacea	4.98	65.91	10.21	79.34	79.34
Nemertea	1.56	16.09	1.56	19.36	98.70

Groups N-U & U
Average dissimilarity = 22.01

	Group N-U	Group U				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Nemertea	0.27	1.56	11.05	2.32	50.19	50.19
Crustacea	5.03	4.98	4.26	1.35	19.35	69.54
Annelida	0.40	0.29	3.63	0.89	16.49	86.03
Mollusca	0.13	0.27	3.07	0.75	13.97	100.00

Examines Season groups
(across all Condition groups)
Group W
Average similarity: 87.12

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Crustacea	4.96	76.11	4.76	87.37	87.37
Nemertea	0.82	9.93	0.92	11.40	98.76

Group S
Average similarity: 81.94

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Crustacea	5.06	73.48	10.88	89.68	89.68
Nemertea	1.01	7.31	0.65	8.92	98.60

Groups W & S
Average dissimilarity = 15.79

Species	Group W Av.Abund	Group S Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Nemertea	0.82	1.01	4.86	0.98	30.74	30.74
Crustacea	4.96	5.06	4.19	1.43	26.54	57.28
Annelida	0.25	0.44	3.76	0.90	23.78	81.06
Mollusca	0.27	0.13	2.99	0.75	18.94	100.00

SIMPER – Region B, 4th root transformed phylum abundance data.

Condition
Group N-U
Average similarity: 77.11

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Crustacea	3.98	31.08	6.01	40.31	40.31
Mollusca	2.87	18.72	2.61	24.27	64.58
Annelida	2.80	16.99	4.34	22.03	86.61
Nemertea	2.68	10.32	0.96	13.39	100.00

Group U
Average similarity: 86.15

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Crustacea	5.42	40.38	11.40	46.87	46.87
Mollusca	3.22	21.90	5.95	25.43	72.30
Annelida	2.67	17.24	5.06	20.02	92.32

Groups N-U & U
Average dissimilarity = 22.72

Species	Group N-U Av.Abund	Group U Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Nemertea	2.68	1.18	8.16	1.73	35.92	35.92
Crustacea	3.98	5.42	5.95	1.90	26.20	62.12
Annelida	2.80	2.67	4.32	1.45	19.02	81.14
Mollusca	2.87	3.22	4.29	1.16	18.86	100.00

PERMANOVA – All sites, 4th root transformed all feeding guilds, abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	779.56	779.56	3.3968	0.1279	800
Se	1	679.01	679.01	1.8806	0.2445	800
Co	1	907.4	907.4	0.84948	0.4934	800
Bi	1	10135	10135	4.2729	0.341	3
Re(Bi)	2	4743.6	2371.8	21.999	0.0001	9939
YexSe	1	123.2	123.2	1.7825	0.2614	7226
YexCo	1	308.53	308.53	12.806	0.0347	7193
YexBi	1	339.68	339.68	1.4801	0.2954	800
SexCo	1	380.78	380.78	1.8248	0.2645	7219
SexBi	1	-127.08	-127.08	Negative		
CoxBi	1	1241.6	1241.6	1.1624	0.3701	799
YexRe(Bi)	2	459	229.5	2.1286	0.0724	9946
SexRe(Bi)	2	722.14	361.07	3.3489	0.0063	9956
CoxRe(Bi)	2	2136.4	1068.2	9.9073	0.0001	9954
YexSexCo	1	131.42	131.42	2.3432	0.1964	9570
YexSexBi	1	205.71	205.71	2.9763	0.1801	7116
YexCoxBi	1	511.6	511.6	21.236	0.0458	7142
SexCoxBi	1	31.713	31.713	0.15198	0.7673	7067
YexSexRe(Bi)	2	138.23	69.117	0.64106	0.6545	9952
YexCoxRe(Bi)	2	48.184	24.092	0.22345	0.8884	9945
SexCoxRe(Bi)	2	417.34	208.67	1.9354	0.1101	9953
YexSexCoxBi	1	107.85	107.85	1.9228	0.242	9533
YexSexCoxRe(Bi)	2	112.18	56.088	0.52022	0.7324	9959
Res	32	3450.1	107.82			
Total	63	27983				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	17.189	4.146
S(Se)	9.9357	3.1521
S(Co)	-5.0243	-2.2415
S(Bi)	242.58	15.575
V(Re(Bi))	141.5	11.895
S(YexSe)	3.3801	1.8385
S(YexCo)	17.777	4.2163
S(YexBi)	6.8863	2.6242
S(SexCo)	10.757	3.2797
S(SexBi)	-30.509	-5.5235
S(CoxBi)	10.839	3.2923
V(YexRe(Bi))	15.21	3.9
V(SexRe(Bi))	31.656	5.6264
V(CoxRe(Bi))	120.04	10.956
S(YexSexCo)	9.4171	3.0687
S(YexSexBi)	17.074	4.1321
S(YexCoxBi)	60.939	7.8063
S(SexCoxBi)	-22.12	-4.7032
V(YexSexRe(Bi))	-9.6749	-3.1104
V(YexCoxRe(Bi))	-20.931	-4.5751
V(SexCoxRe(Bi))	25.214	5.0213
S(YexSexCoxBi)	12.939	3.5971
V(YexSexCoxRe(Bi))	-25.864	-5.0857
V(Res)	107.82	10.383

PERMANOVA – Region A, 4th root transformed all feeding guilds, abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	273.96	273.96	2.3746	0.1036	9929
Se	1	121.33	121.33	1.0517	0.405	9917
Co	1	3012.8	3012.8	26.114	0.0008	9906
YexSe	1	101.12	101.12	0.87647	0.4713	9928
YexCo	1	32.026	32.026	0.27759	0.8294	9928
SexCo	1	241.59	241.59	2.0941	0.1408	9916
YexSexCo	1	27.378	27.378	0.23731	0.8654	9933
Res	8	922.96	115.37			
Total	15	4733.2				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	19.824	4.4524
S(Se)	0.74536	0.86335
S(Co)	362.18	19.031
S(YexSe)	-3.5631	-1.8876
S(YexCo)	-20.836	-4.5647
S(SexCo)	31.556	5.6175
S(YexSexCo)	-43.996	-6.6329
V(Res)	115.37	10.741

PERMANOVA – Region B, 4th root transformed all feeding guilds, abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	972.85	972.85	17.499	0.0026	9936
Se	1	176.39	176.39	3.1728	0.0676	9934
Co	1	621.1	621.1	11.172	0.002	9932
YexSe	1	102.43	102.43	1.8425	0.1865	9932
YexCo	1	146.31	146.31	2.6318	0.1072	9921
SexCo	1	101.23	101.23	1.8209	0.1989	9948
YexSexCo	1	168.07	168.07	3.0231	0.0938	9914
Res	8	444.76	55.595			
Total	15	2733.1				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	114.66	10.708
S(Se)	15.099	3.8858
S(Co)	70.688	8.4076
S(YexSe)	11.709	3.4219
S(YexCo)	22.68	4.7623
S(SexCo)	11.409	3.3777
S(YexSexCo)	56.236	7.4991
V(Res)	55.595	7.4562

PERMANOVA – Region C, 4th root transformed all feeding guilds, abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	146.08	146.08	0.9008	0.4466	9951
Se	1	332.25	332.25	2.0488	0.1596	9930
Co	1	566.78	566.78	3.495	0.0591	9934
YexSe	1	236.59	236.59	1.4589	0.2797	9935
YexCo	1	483.61	483.61	2.9821	0.1066	9929
SexCo	1	40.668	40.668	0.25077	0.7437	9937
YexSexCo	1	113.04	113.04	0.69703	0.5276	9951
Res	8	1297.4	162.17			
Total	15	3216.4				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-2.0109	-1.4181
S(Se)	21.261	4.6109
S(Co)	50.576	7.1117
S(YexSe)	18.604	4.3133
S(YexCo)	80.36	8.9644
S(SexCo)	-30.375	-5.5114
S(YexSexCo)	-24.567	-4.9565
V(Res)	162.17	12.735

PERMANOVA – Region D, 4th root transformed all feeding guilds, abundance data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	185.34	185.34	1.8887	0.1965	9930
Se	1	644.09	644.09	6.5635	0.0051	9932
Co	1	84.674	84.674	0.86286	0.4688	9939
YexSe	1	27.009	27.009	0.27523	0.7642	9943
YexCo	1	206.37	206.37	2.1029	0.1479	9935
SexCo	1	446.34	446.34	4.5484	0.0129	9926
YexSexCo	1	42.965	42.965	0.43783	0.6465	9929
Res	8	785.05	98.132			
Total	15	2421.8				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	10.901	3.3017
S(Se)	68.245	8.261
S(Co)	-1.6822	-1.297
S(YexSe)	-17.781	-4.2167
S(YexCo)	27.058	5.2018
S(SexCo)	87.052	9.3302
S(YexSexCo)	-27.584	-5.252
V(Res)	98.132	9.9061

PERMANOVA (pairwise) – Region D, 4th root transformed all feeding guilds, abundance data.

Term 'SexCo' for pairs of levels of factor 'Season'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	2.4261	0.0491	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	76.461	
S	74.292	91.799

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	2.1096	0.036	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	90.706	
S	87.681	92.874

Term 'SexCo' for pairs of levels of factor 'Condition'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	1.2646	0.319	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	76.461	
U	80.661	90.706

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	3.6079	0.0326	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	91.799	
U	87.172	92.874

PERMDISP – Region A, 4th root transformed all feeding guilds, abundance data.

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.33626 df1: 1 df2: 14
P(perm): 0.5981

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.57988	0.6087

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	9.9508	1.6428
U	8	8.5008	1.885

PERMDISP – Region B, 4th root transformed all feeding guilds, abundance data.

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 2.4411E-4 df1: 1 df2: 14
P(perm): 0.9893

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	1.5624E-2	0.9926

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	9.8059	1.8601
2	8	9.8367	0.64356

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 3.9203 df1: 1 df2: 14
P(perm): 0.0695

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	1.98	7.27E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	12.676	2.2356
U	8	7.7755	1.0616

PERMDISP – Region D, 4th root transformed all feeding guilds, abundance data.

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 3.3979 df1: 1 df2: 14
P(perm): 0.1155

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	1.8434	0.121

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	11.526	2.2062
S	8	7.2132	0.77954

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 16.19 df1: 1 df2: 14
P(perm): 0.0004

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	4.0237	9E-4

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	14.731	1.7147
U	8	7.0389	0.8456

ANOSIM – Region A, 4th root transformed all feeding guilds, abundance data.

Condition
Global Test
Sample statistic (Global R): 0.823
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 0

ANOSIM – Region B, 4th root transformed all feeding guilds, abundance data.

Condition
Global Test
Sample statistic (Global R): 0.316
Significance level of sample statistic: 0.5%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 4

Year
Global Test
Sample statistic (Global R): 0.353
Significance level of sample statistic: 0.4%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 3

ANOSIM – Region D, 4th root transformed all feeding guilds, abundance data.

Condition (across Summer)
Global Test
Sample statistic (Global R): 0.75
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Season (across Non-upwelling)
Global Test
Sample statistic (Global R): 0.573
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Season (across Upwelling)
Global Test
Sample statistic (Global R): 0.635
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

SIMPER – Region A, 4th root transformed all feeding guilds, abundance data.

Condition

Group N-U

Average similarity: 84.69

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Scavenger	5.00	59.33	8.55	70.05	70.05
Deposit	1.60	14.24	1.67	16.81	86.87
Filter	1.29	10.76	1.62	12.71	99.57

Group U

Average similarity: 86.97

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Scavenger	4.11	31.72	9.67	36.48	36.48
Deposit	3.88	27.47	4.48	31.59	68.07
Filter	2.66	18.01	3.93	20.71	88.78
Predator	1.58	9.76	1.63	11.22	100.00

Groups N-U & U

Average dissimilarity = 29.62

	Group N-U	Group U				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Deposit	1.60	3.88	11.30	2.13	38.16	38.16
Filter	1.29	2.66	7.09	1.57	23.93	62.09
Predator	0.27	1.58	6.76	1.95	22.83	84.92
Scavenger	5.00	4.11	4.47	1.59	15.08	100.00

SIMPER – Region B, 4th root transformed all feeding guilds, abundance data.

Condition

Group N-U

Average similarity: 80.86

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Scavenger	3.86	28.36	6.61	35.07	35.07
Filter	2.96	19.17	4.03	23.70	58.78
Predator	3.21	17.56	3.52	21.71	80.49
Deposit	2.84	15.77	2.88	19.51	100.00

Group U

Average similarity: 88.89

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Scavenger	4.73	31.80	10.85	35.77	35.77
Filter	4.40	27.14	10.37	30.53	66.30
Deposit	3.15	17.44	4.94	19.62	85.92
Predator	2.04	12.52	10.12	14.08	100.00

Groups N-U & U
Average dissimilarity = 19.01

Species	Group N-U Av.Abund	Group U Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Filter	2.96	4.40	5.63	1.30	29.63	29.63
Predator	3.21	2.04	5.10	1.30	26.84	56.46
Deposit	2.84	3.15	4.79	1.33	25.18	81.65
Scavenger	3.86	4.73	3.49	1.67	18.35	100.00

SIMPER – Region D, 4th root transformed all feeding guilds, abundance data.

Season
Group W
Average similarity: 81.91

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Scavenger	2.34	36.23	9.19	44.23	44.23
Filter	1.46	20.61	4.35	25.16	69.39
Predator	1.12	13.50	1.66	16.48	85.87
Deposit	1.18	11.57	1.04	14.13	100.00

Group S
Average similarity: 89.39

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Scavenger	2.85	33.43	12.83	37.40	37.40
Deposit	2.12	22.11	5.12	24.73	62.14
Filter	1.86	19.69	4.99	22.03	84.16
Predator	1.47	14.16	4.63	15.84	100.00

Groups W & S
Average dissimilarity = 18.42

Species	Group W Av.Abund	Group S Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Deposit	1.18	2.12	7.19	1.27	39.01	39.01
Predator	1.12	1.47	4.01	1.16	21.76	60.77
Filter	1.46	1.86	3.63	1.53	19.73	80.50
Scavenger	2.34	2.85	3.59	1.95	19.50	100.00

PERMANOVA – All sites, 4th root transformed predator abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	4.1346	4.1346	4.6567	0.1507	798
Se	1	2.3202E-2	2.3202E-2	4.7508E-2	0.8201	799
Co	1	0.45242	0.45242	7.2193E-2	0.7553	801
Bi	1	8.52	8.52	0.68035	0.6736	3
Re(Bi)	2	25.046	12.523	45.857	0.0001	9946
YexSe	1	0.48846	0.48846	1.7861	0.318	6984
YexCo	1	8.3233E-3	8.3233E-3	6.6256E-3	0.8991	7165
YexBi	1	5.599	5.599	6.3059	0.13	801
SexCo	1	0.46272	0.46272	0.54765	0.5386	7131
SexBi	1	1.3281E-3	1.3281E-3	2.7194E-3	0.8216	799
CoxBi	1	0.87922	0.87922	0.1403	0.7294	800
YexRe(Bi)	2	1.7758	0.88789	3.2513	0.0511	9956
SexRe(Bi)	2	0.97675	0.48837	1.7883	0.1799	9953
CoxRe(Bi)	2	12.534	6.2668	22.948	0.0001	9960
YexSexCo	1	7.0553E-2	7.0553E-2	0.28835	0.6378	9490
YexSexBi	1	2.2942E-2	2.2942E-2	8.3893E-2	0.7949	7168
YexCoxBi	1	3.3122	3.3122	2.6366	0.2528	7066
SexCoxBi	1	0.68027	0.68027	0.80513	0.4632	7148
YexSexRe(Bi)	2	0.54695	0.27347	1.0014	0.3721	9937
YexCoxRe(Bi)	2	2.5125	1.2562	4.6001	0.0177	9947
SexCoxRe(Bi)	2	1.6898	0.84492	3.0939	0.0594	9957
YexSexCoxBi	1	0.23208	0.23208	0.94849	0.4345	9439
YexSexCoxRe(Bi)	2	0.48936	0.24468	0.89598	0.407	9955
Res	32	8.7388	0.27309			
Total	63	79.197				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.10146	0.31853
S(Se)	-1.4537E-2	-0.12057
S(Co)	-0.1817	-0.42626
S(Bi)	-0.12509	-0.35368
V(Re(Bi))	0.76562	0.87499
S(YexSe)	1.3437E-2	0.11592
S(YexCo)	-7.7995E-2	-0.27928
S(YexBi)	0.29444	0.54262
S(SexCo)	-2.3888E-2	-0.15456
S(SexBi)	-3.044E-2	-0.17447
S(CoxBi)	-0.33672	-0.58028
V(YexRe(Bi))	7.685E-2	0.27722
V(SexRe(Bi))	2.6911E-2	0.16404
V(CoxRe(Bi))	0.74921	0.86557
S(YexSexCo)	-2.1766E-2	-0.14753
S(YexSexBi)	-3.1316E-2	-0.17696
S(YexCoxBi)	0.257	0.50695
S(SexCoxBi)	-2.0581E-2	-0.14346
V(YexSexRe(Bi))	9.6399E-5	9.8183E-3
V(YexCoxRe(Bi))	0.24579	0.49577
V(SexCoxRe(Bi))	0.14296	0.3781
S(YexSexCoxBi)	-3.151E-3	-5.6133E-2
V(YexSexCoxRe(Bi))	-1.4204E-2	-0.11918
V(Res)	0.27309	0.52258

PERMANOVA – Region A, 4th root transformed predator abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1.6019	1.6019	6.4042	0.0273	9789
Se	1	0.12809	0.12809	0.51208	0.5182	9726
Co	1	6.8613	6.8613	27.43	0.001	9369
YexSe	1	0.8234	0.8234	3.2918	0.1007	9785
YexCo	1	2.9263E-2	2.9263E-2	0.11699	0.6829	9676
SexCo	1	0.54274	0.54274	2.1698	0.1796	9777
YexSexCo	1	3.504E-2	3.504E-2	0.14008	0.67	9648
Res	8	2.0011	0.25014			
Total	15	12.023				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.16897	0.41106
S(Se)	-1.5256E-2	-0.12351
S(Co)	0.8264	0.90906
S(YexSe)	0.14332	0.37857
S(YexCo)	-5.5218E-2	-0.23499
S(SexCo)	7.3151E-2	0.27046
S(YexSexCo)	-0.10755	-0.32795
V(Res)	0.25014	0.50014

PERMANOVA – Region B, 4th root transformed predator abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	9.8215	9.8215	29.386	0.0014	9798
Se	1	2.8605E-2	2.8605E-2	8.5588E-2	0.7846	9795
Co	1	5.543	5.543	16.585	0.0051	9843
YexSe	1	3.2546E-3	3.2546E-3	9.7379E-3	0.9223	9794
YexCo	1	3.6092	3.6092	10.799	0.0118	9778
SexCo	1	0.77661	0.77661	2.3236	0.1667	9794
YexSexCo	1	0.16266	0.16266	0.48669	0.4956	9822
Res	8	2.6738	0.33422			
Total	15	22.619				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	1.1859	1.089
S(Se)	-3.8202E-2	-0.19545
S(Co)	0.6511	0.80691
S(YexSe)	-8.2742E-2	-0.28765
S(YexCo)	0.81874	0.90484
S(SexCo)	0.1106	0.33256
S(YexSexCo)	-8.578E-2	-0.29288
V(Res)	0.33422	0.57812

PERMANOVA (pairwise)– Region B, 4th root transformed predator abundance data (Euclidean distance).

Term 'YexCo' for pairs of levels of factor 'Year'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	4.5107	0.0304	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Distance between/within groups

	1	2
1	0.64982	
2	2.5169	1.1096

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	4.079	0.0289	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Distance between/within groups

	1	2
1	0.18293	
2	0.62208	0.45573

Term 'YexCo' for pairs of levels of factor 'Condition'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
N-U, U	0.71254	0.5714	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	0.64982	
U	0.39031	0.18293

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
N-U, U	4.4116	0.0338	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	1.1096	
U	2.1271	0.45573

PERMANOVA – Region C, 4th root transformed predator abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	8.4157E-2	8.4157E-2	0.21459	0.6602	9783
Se	1	0.34729	0.34729	0.88554	0.3688	9788
Co	1	1.192	1.192	3.0396	0.1151	9750
YexSe	1	5.0998E-3	5.0998E-3	1.3004E-2	0.9056	9673
YexCo	1	1.9174	1.9174	4.8891	0.0589	9794
SexCo	1	9.9909E-2	9.9909E-2	0.25476	0.6169	9794
YexSexCo	1	5.3781E-4	5.3781E-4	1.3713E-3	0.9575	9721
Res	8	3.1374	0.39218			
Total	15	6.7838				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-3.8503E-2	-0.19622
S(Se)	-5.611E-3	-7.4906E-2
S(Co)	9.9983E-2	0.3162
S(YexSe)	-9.6769E-2	-0.31108
S(YexCo)	0.38131	0.6175
S(SexCo)	-7.3067E-2	-0.27031
S(YexSexCo)	-0.19582	-0.44252
V(Res)	0.39218	0.62624

PERMANOVA – Region D, 4th root transformed predator abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1.8263E-3	1.8263E-3	1.5769E-2	0.9013	9827
Se	1	0.49729	0.49729	4.2938	0.0773	9828
Co	1	0.26882	0.26882	2.3211	0.1659	9800
YexSe	1	0.22659	0.22659	1.9565	0.1991	9792
YexCo	1	0.27718	0.27718	2.3932	0.1612	9781
SexCo	1	1.4136	1.4136	12.205	0.0101	9808
YexSexCo	1	0.59375	0.59375	5.1266	0.0578	9751
Res	8	0.92654	0.11582			
Total	15	4.2056				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-1.4249E-2	-0.11937
S(Se)	4.7685E-2	0.21837
S(Co)	1.9125E-2	0.13829
S(YexSe)	2.7694E-2	0.16641
S(YexCo)	4.034E-2	0.20085
S(SexCo)	0.32444	0.56959
S(YexSexCo)	0.23897	0.48884
V(Res)	0.11582	0.34032

PERMANOVA (pairwise) – Region D, 4th root transformed predator abundance data (Euclidean distance).

Term 'SexCo' for pairs of levels of factor 'Condition'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	1.0688	0.362	267

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	0.84482	
U	0.54654	0.38914

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	6.4652	0.0293	153

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	0.32801	
U	0.85371	9.4604E-2

Term 'SexCo' for pairs of levels of factor 'Season'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	3.1629	0.0478	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Distance between/within groups

	W	S
W	0.84482	
S	0.96347	0.32801

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	1.4953	0.2681	148

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Distance between/within groups

	W	S
W	0.38914	
S	0.26552	9.4604E-2

PERMDISP– Region A, 4th root transformed predator abundance data (Euclidean distance).

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.13829 df1: 1 df2: 14
P(perm): 0.6834

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.37188	0.6873

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	0.76511	9.313E-2
2	8	0.69762	0.15577

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 7.2576E-2 df1: 1 df2: 14
P(perm): 0.7741

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.2694	0.774

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	0.41048	9.134E-2
U	8	0.46266	0.17082

PERMDISP– Region B, 4th root transformed predator abundance data (Euclidean distance).

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 13.397 df1: 1 df2: 14
P(perm): 0.0016

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	3.6603	1.2E-3

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	1.2584	0.23711
U	8	0.36245	6.0826E-2

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 11.479 df1: 1 df2: 14
P(perm): 0.0049

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	3.388	5.3E-3

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	0.24514	9.9738E-2
2	8	1.0635	0.22

PERMDISP– Region D, 4th root transformed predator abundance data (Euclidean distance).

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.31159 df1: 1 df2: 14
P(perm): 0.6025

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.5582	0.59

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.34117	0.13734
S	8	0.42685	6.8549E-2

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 4.6463 df1: 1 df2: 14
P(perm): 0.0272
PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	2.1555	2.64E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	0.52331	0.14996
U	8	0.16824	6.8172E-2

ANOSIM– Region A, 4th root transformed predator abundance data (Euclidean distance).

Condition
Global Test
Sample statistic (Global R): 0.576
Significance level of sample statistic: 0.4%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 3

ANOSIM– Region B, 4th root transformed predator abundance data (Euclidean distance).

Condition (across Y2)
Global Test
Sample statistic (Global R): 0.833
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Year (across Upwelling)
Global Test
Sample statistic (Global R): 0.49
Significance level of sample statistic: 8.6%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 3

Year (across Non-upwelling)
Global Test
Sample statistic (Global R): 0.885
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

ANOSIM– Region D, 4th root transformed predator abundance data (Euclidean distance).

Condition (across Summer)
Global Test
Sample statistic (Global R): 0.906
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

PERMANOVA – All sites, 4th root transformed deposit feeder abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	7.6342	7.6342	7.617	0.1135	799
Se	1	3.5951	3.5951	2.6713	0.2366	799
Co	1	12.624	12.624	3.1101	0.1982	799
Bi	1	48.686	48.686	10.437	0.3414	3
Re(Bi)	2	9.3299	4.6649	10.544	0.0004	9944
YexSe	1	6.415E-3	6.415E-3	5.3529E-2	0.7903	7092
YexCo	1	0.35445	0.35445	10.596	0.0846	7183
YexBi	1	4.0912	4.0912	4.082	0.1693	801
SexCo	1	1.1545	1.1545	1.6545	0.3315	7109
SexBi	1	8.627E-3	8.627E-3	6.4102E-3	0.8189	799
CoxBi	1	2.6791	2.6791	0.66003	0.5139	793
YexRe(Bi)	2	2.0045	1.0023	2.2654	0.1181	9952
SexRe(Bi)	2	2.6916	1.3458	3.042	0.0632	9951
CoxRe(Bi)	2	8.1179	4.059	9.1745	0.0008	9961
YexSexCo	1	1.3162	1.3162	7.5747	0.1136	9325
YexSexBi	1	0.28699	0.28699	2.3948	0.2595	7090
YexCoxBi	1	0.46316	0.46316	13.846	0.067	7132
SexCoxBi	1	0.47367	0.47367	0.67882	0.5014	7161
YexSexRe(Bi)	2	0.23968	0.11984	0.27088	0.771	9949
YexCoxRe(Bi)	2	6.6904E-2	3.3452E-2	7.5611E-2	0.9277	9947
SexCoxRe(Bi)	2	1.3956	0.69778	1.5772	0.208	9951
YexSexCoxBi	1	1.646	1.646	9.4722	0.0932	9195
YexSexCoxRe(Bi)	2	0.34754	0.17377	0.39277	0.6796	9942
Res	32	14.157	0.44242			
Total	63	123.37				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.20725	0.45524
S(Se)	7.0291E-2	0.26512
S(Co)	0.26765	0.51735
S(Bi)	1.3757	1.1729
V(Re(Bi))	0.26391	0.51372
S(YexSe)	-7.0891E-3	-8.4197E-2
S(YexCo)	2.0062E-2	0.14164
S(YexBi)	0.19306	0.43938
S(SexCo)	2.8542E-2	0.16895
S(SexBi)	-8.3575E-2	-0.28909
S(CoxBi)	-8.6244E-2	-0.29367
V(YexRe(Bi))	6.9979E-2	0.26454
V(SexRe(Bi))	0.11293	0.33604
V(CoxRe(Bi))	0.45207	0.67236
S(YexSexCo)	0.14281	0.3779
S(YexSexBi)	2.0894E-2	0.14455
S(YexCoxBi)	5.3714E-2	0.23176
S(SexCoxBi)	-2.8014E-2	-0.16737
V(YexSexRe(Bi))	-8.0644E-2	-0.28398
V(YexCoxRe(Bi))	-0.10224	-0.31975
V(SexCoxRe(Bi))	6.3841E-2	0.25267
S(YexSexCoxBi)	0.36805	0.60667
V(YexSexCoxRe(Bi))	-0.13433	-0.3665
V(Res)	0.44242	0.66515

PERMANOVA – Region A, 4th root transformed deposit feeder abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	2.2132	2.2132	3.1285	0.1129	9831
Se	1	0.1406	0.1406	0.19875	0.6705	9832
Co	1	20.813	20.813	29.421	0.0007	9825
YexSe	1	1.3263E-2	1.3263E-2	1.8748E-2	0.8981	9793
YexCo	1	2.1235E-3	2.1235E-3	3.0016E-3	0.9562	9823
SexCo	1	0.18175	0.18175	0.25692	0.6255	9820
YexSexCo	1	1.4946	1.4946	2.1127	0.1855	9773
Res	8	5.6595	0.70744			
Total	15	30.519				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.18822	0.43385
S(Se)	-7.0854E-2	-0.26618
S(Co)	2.5133	1.5853
S(YexSe)	-0.17354	-0.41659
S(YexCo)	-0.17633	-0.41991
S(SexCo)	-0.13142	-0.36252
S(YexSexCo)	0.39358	0.62736
V(Res)	0.70744	0.84109

PERMANOVA – Region B, 4th root transformed deposit feeder abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	10.877	10.877	22.929	0.0026	9830
Se	1	2.605	2.605	5.4914	0.047	9822
Co	1	0.39387	0.39387	0.8303	0.3946	9814
YexSe	1	0.25064	0.25064	0.52837	0.4873	9803
YexCo	1	1.7236E-2	1.7236E-2	3.6335E-2	0.8558	9829
SexCo	1	1.6085E-3	1.6085E-3	3.3908E-3	0.9573	9816
YexSexCo	1	1.4585	1.4585	3.0747	0.1237	9826
Res	8	3.795	0.47437			
Total	15	19.398				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	1.3003	1.1403
S(Se)	0.26633	0.51607
S(Co)	-1.0063E-2	-0.10031
S(YexSe)	-5.5932E-2	-0.2365
S(YexCo)	-0.11428	-0.33806
S(SexCo)	-0.11819	-0.34379
S(YexSexCo)	0.49208	0.70148
V(Res)	0.47437	0.68875

PERMANOVA – Region C, 4th root transformed deposit feeder abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.63667	0.63667	2.0587	0.1918	9628
Se	1	6.2775E-3	6.2775E-3	2.0299E-2	0.8862	9732
Co	1	1.9391	1.9391	6.2702	0.0387	9592
YexSe	1	0.26561	0.26561	0.85887	0.3752	9696
YexCo	1	0.63667	0.63667	2.0587	0.1834	9649
SexCo	1	6.2775E-3	6.2775E-3	2.0299E-2	0.8868	9736
YexSexCo	1	0.23486	0.23486	0.75945	0.4055	9206
Res	8	2.474	0.30926			
Total	15	6.1995				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	4.0927E-2	0.2023
S(Se)	-3.7872E-2	-0.19461
S(Co)	0.20373	0.45137
S(YexSe)	-1.0912E-2	-0.10446
S(YexCo)	8.1853E-2	0.2861
S(SexCo)	-7.5745E-2	-0.27522
S(YexSexCo)	-3.7196E-2	-0.19286
V(Res)	0.30926	0.55611

PERMANOVA – Region D, 4th root transformed deposit feeder abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	3.3146E-3	3.3146E-3	1.1897E-2	0.9094	9820
Se	1	3.5436	3.5436	12.719	0.0104	9837
Co	1	0.27425	0.27425	0.98433	0.3479	9846
YexSe	1	3.5704E-3	3.5704E-3	1.2815E-2	0.9162	9815
YexCo	1	0.22848	0.22848	0.82007	0.3835	9810
SexCo	1	2.8341	2.8341	10.172	0.0175	9836
YexSexCo	1	0.12177	0.12177	0.43705	0.5196	9826
Res	8	2.2289	0.27861			
Total	15	9.2379				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-3.4412E-2	-0.1855
S(Se)	0.40812	0.63884
S(Co)	-5.4556E-4	-2.3357E-2
S(YexSe)	-6.876E-2	-0.26222
S(YexCo)	-1.2533E-2	-0.11195
S(SexCo)	0.63886	0.79929
S(YexSexCo)	-7.8423E-2	-0.28004
V(Res)	0.27861	0.52784

PERMANOVA (Pairwise) – Region D, 4th root transformed deposit feeder abundance data (Euclidean distance).

Term 'SexCo' for pairs of levels of factor 'Season'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	3.9155	0.0443	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Distance between/within groups

	W	S
W	0.85624	
S	1.7829	0.39216

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	0.37268	0.7407	269

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Distance between/within groups

	W	S
W	0.24712	
S	0.36983	0.49875

Term 'SexCo' for pairs of levels of factor 'Condition'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	2.3999	0.1615	265

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	0.85624	
U	1.1036	0.24712

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	2.2376	0.1002	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	0.39216	
U	0.61658	0.49875

PERMDISP – Region A, 4th root transformed deposit feeder abundance data (Euclidean distance).

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.25074 df1: 1 df2: 14
P(perm): 0.5972

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.50074	0.5958

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	0.4743	0.20107
U	8	0.62119	0.21357

PERMDISP – Region B, 4th root transformed deposit feeder abundance data (Euclidean distance).

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 5.3172E-2 df1: 1 df2: 14
P(perm): 0.8605

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.23059	0.851

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	0.62677	9.7572E-2
2	8	0.66819	0.15084

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.10289 df1: 1 df2: 14
P(perm): 0.769

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.32077	0.7732

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.9531	0.22175
S	8	0.87387	0.10883

PERMDISP – Region C, 4th root transformed deposit feeder abundance data (Euclidean distance).

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.40105 df1: 1 df2: 14
P(perm): 0.5684

PAIRWISE COMPARISONS

Groups	t	P(perm)
(U,N-U)	0.63328	0.5845

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
U	8	0.47313	0.13158
N-U	8	0.375	8.1832E-2

PERMDISP – Region D, 4th root transformed deposit feeder abundance data (Euclidean distance).

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 10.852 df1: 1 df2: 14
P(perm): 0.0057

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	3.2943	6E-3

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	0.89147	0.18351
U	8	0.25695	5.8539E-2

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 1.8567 df1: 1 df2: 14
P(perm): 0.2745

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	1.3626	0.2681

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.58905	0.15583
S	8	0.32778	0.11173

ANOSIM – Region A, 4th root transformed deposit feeder abundance data (Euclidean distance).

Condition
Global Test
Sample statistic (Global R): 0.7
Significance level of sample statistic: 0.2%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 1

ANOSIM – Region B, 4th root transformed deposit feeder abundance data (Euclidean distance).

Season
Global Test
Sample statistic (Global R): -0.004
Significance level of sample statistic: 38.8%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 387

Year
Global Test
Sample statistic (Global R): 0.455
Significance level of sample statistic: 0.6%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 5

ANOSIM – Region D, 4th root transformed deposit feeder abundance data (Euclidean distance).

Season (across Non-upwelling)
Global Test
Sample statistic (Global R): 0.813
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

PERMANOVA – All sites, 4th root transformed scavenger abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.58226	0.58226	2.1612	0.2624	798
Se	1	5.8558E-2	5.8558E-2	5.167E-2	0.8278	800
Co	1	0.11105	0.11105	3.6E-2	0.7435	795
Bi	1	44.425	44.425	65.605	0.3357	3
Re(Bi)	2	1.3543	0.67716	4.4877	0.019	9939
YexSe	1	0.43675	0.43675	4.032	0.1877	7130
YexCo	1	5.2421E-2	5.2421E-2	3.7177	0.1955	7126
YexBi	1	0.10559	0.10559	0.39195	0.5887	799
SexCo	1	0.11124	0.11124	0.6564	0.5089	7126
SexBi	1	6.7027E-2	6.7027E-2	5.9143E-2	0.8176	799
CoxBi	1	0.10369	0.10369	3.3613E-2	0.7425	797
YexRe(Bi)	2	0.53882	0.26941	1.7854	0.1796	9949
SexRe(Bi)	2	2.2666	1.1333	7.5107	0.0031	9949
CoxRe(Bi)	2	6.1697	3.0849	20.444	0.0001	9953
YexSexCo	1	3.1329E-2	3.1329E-2	1.4141	0.3531	9172
YexSexBi	1	0.24105	0.24105	2.2253	0.2694	7116
YexCoxBi	1	0.10286	0.10286	7.2945	0.1178	7160
SexCoxBi	1	1.2243E-2	1.2243E-2	7.2244E-2	0.7921	7194
YexSexRe(Bi)	2	0.21664	0.10832	0.71788	0.492	9951
YexCoxRe(Bi)	2	2.8201E-2	1.41E-2	9.3447E-2	0.9094	9949
SexCoxRe(Bi)	2	0.33893	0.16947	1.1231	0.3338	9956
YexSexCoxBi	1	0.16168	0.16168	7.2978	0.1174	9440
YexSexCoxRe(Bi)	2	4.4309E-2	2.2155E-2	0.14682	0.8637	9937
Res	32	4.8285	0.15089			
Total	63	62.389				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	9.7765E-3	9.8876E-2
S(Se)	-3.3586E-2	-0.18326
S(Co)	-9.2931E-2	-0.30485
S(Bi)	1.3671	1.1692
V(Re(Bi))	3.2892E-2	0.18136
S(YexSe)	2.0527E-2	0.14327
S(YexCo)	2.395E-3	4.8939E-2
S(YexBi)	-1.0238E-2	-0.10119
S(SexCo)	-3.6393E-3	-6.0326E-2
S(SexBi)	-6.6642E-2	-0.25815
S(CoxBi)	-0.18632	-0.43165
V(YexRe(Bi))	1.4815E-2	0.12172
V(SexRe(Bi))	0.1228	0.35043
V(CoxRe(Bi))	0.36674	0.60559
S(YexSexCo)	1.1468E-3	3.3864E-2
S(YexSexBi)	1.6591E-2	0.1288
S(YexCoxBi)	1.1094E-2	0.10533
S(SexCoxBi)	-1.9653E-2	-0.14019
V(YexSexRe(Bi))	-1.0643E-2	-0.10316
V(YexCoxRe(Bi))	-3.4198E-2	-0.18493
V(SexCoxRe(Bi))	4.6438E-3	6.8145E-2
S(YexSexCoxBi)	3.4881E-2	0.18677
V(YexSexCoxRe(Bi))	-6.4368E-2	-0.25371
V(Res)	0.15089	0.38845

PERMANOVA – Region A, 4th root transformed scavenger abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.20902	0.20902	1.2065	0.3006	9802
Se	1	5.0518E-3	5.0518E-3	2.916E-2	0.87	9788
Co	1	3.1041	3.1041	17.918	0.0035	9775
YexSe	1	7.2839E-2	7.2839E-2	0.42045	0.539	9751
YexCo	1	4.6049E-4	4.6049E-4	2.6581E-3	0.9551	9777
SexCo	1	0.40093	0.40093	2.3143	0.166	9780
YexSexCo	1	2.0744E-2	2.0744E-2	0.11974	0.7309	9789
Res	8	1.3859	0.17324			
Total	15	5.199				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	4.472E-3	6.6873E-2
S(Se)	-2.1024E-2	-0.145
S(Co)	0.36635	0.60527
S(YexSe)	-2.51E-2	-0.15843
S(YexCo)	-4.3195E-2	-0.20783
S(SexCo)	5.6921E-2	0.23858
S(YexSexCo)	-7.6248E-2	-0.27613
V(Res)	0.17324	0.41622

PERMANOVA – Region B, 4th root transformed scavenger abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.39794	0.39794	1.978	0.1913	9827
Se	1	0.32714	0.32714	1.626	0.2281	9803
Co	1	3.0646	3.0646	15.232	0.0079	9842
YexSe	1	9.9968E-3	9.9968E-3	4.9688E-2	0.8264	9791
YexCo	1	4.9414E-3	4.9414E-3	2.4561E-2	0.8745	9821
SexCo	1	3.5727E-2	3.5727E-2	0.17758	0.6813	9820
YexSexCo	1	0.18928	0.18928	0.94082	0.3572	9816
Res	8	1.6095	0.20119			
Total	15	5.6391				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	2.4594E-2	0.15683
S(Se)	1.5743E-2	0.12547
S(Co)	0.35793	0.59827
S(YexSe)	-4.7798E-2	-0.21863
S(YexCo)	-4.9062E-2	-0.2215
S(SexCo)	-4.1366E-2	-0.20339
S(YexSexCo)	-5.9535E-3	-7.7159E-2
V(Res)	0.20119	0.44854

PERMANOVA – Region C, 4th root transformed scavenger abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.53405	0.53405	2.6776	0.141	9820
Se	1	1.0128	1.0128	5.0781	0.0566	9838
Co	1	0.12337	0.12337	0.61856	0.4497	9799
YexSe	1	0.71939	0.71939	3.6068	0.091	9846
YexCo	1	0.15291	0.15291	0.76666	0.3969	9806
SexCo	1	8.0883E-3	8.0883E-3	4.0552E-2	0.8448	9815
YexSexCo	1	6.6034E-3	6.6034E-3	3.3108E-2	0.8529	9791
Res	8	1.5956	0.19945			
Total	15	4.1529				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	4.1824E-2	0.20451
S(Se)	0.10167	0.31886
S(Co)	-9.5099E-3	-9.7519E-2
S(YexSe)	0.12998	0.36053
S(YexCo)	-1.1635E-2	-0.10787
S(SexCo)	-4.7841E-2	-0.21873
S(YexSexCo)	-9.6424E-2	-0.31052
V(Res)	0.19945	0.4466

PERMANOVA – Region D, 4th root transformed scavenger abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	8.5661E-2	8.5661E-2	2.8857	0.1151	9792
Se	1	1.0472	1.0472	35.277	0.001	9808
Co	1	9.2423E-2	9.2423E-2	3.1136	0.1134	9836
YexSe	1	9.2213E-2	9.2213E-2	3.1065	0.1109	9793
YexCo	1	2.5162E-2	2.5162E-2	0.84767	0.3787	9848
SexCo	1	1.7673E-2	1.7673E-2	0.59538	0.4562	9815
YexSexCo	1	2.0688E-2	2.0688E-2	0.69693	0.419	9802
Res	8	0.23747	2.9684E-2			
Total	15	1.6185				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	6.9971E-3	8.3649E-2
S(Se)	0.12718	0.35663
S(Co)	7.8424E-3	8.8557E-2
S(YexSe)	1.5632E-2	0.12503
S(YexCo)	-1.1305E-3	-3.3623E-2
S(SexCo)	-3.0027E-3	-5.4797E-2
S(YexSexCo)	-4.4981E-3	-6.7068E-2
V(Res)	2.9684E-2	0.17229

PERMDISP – Region A, 4th root transformed scavenger abundance data (Euclidean distance).

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.6914 df1: 1 df2: 14
P(perm): 0.4575

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.83151	0.4643

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	0.29059	5.1901E-2
U	8	0.35955	6.4691E-2

PERMDISP – Region B, 4th root transformed scavenger abundance data (Euclidean distance).

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.7465 df1: 1 df2: 14
P(perm): 0.4148

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.864	0.416

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	0.37161	9.6509E-2
U	8	0.26044	8.5098E-2

PERMDISP – Region D, 4th root transformed scavenger abundance data (Euclidean distance).

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.77896 df1: 1 df2: 14
P(perm): 0.4237

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.88259	0.4245

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.17582	5.4372E-2
S	8	0.12258	2.6127E-2

ANOSIM – Region B, 4th root transformed scavenger abundance data (Euclidean distance).

Condition

Global Test

Sample statistic (Global R): 0.475
Significance level of sample statistic: 0.4%
Number of permutations: 6435 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 26

ANOSIM – Region D, 4th root transformed scavenger abundance data (Euclidean distance).

Season

Global Test

Sample statistic (Global R): 0.625
Significance level of sample statistic: 0.05%
Number of permutations: 6435 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 3

PERMANOVA – All sites, 4th root transformed filter feeder abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	3.6566	3.6566	7.0253	0.1209	796
Se	1	5.2262	5.2262	258.48	0.0773	760
Co	1	9.73	9.73	324.04	0.0741	784
Bi	1	9.7839	9.7839	0.69974	0.6701	3
Re(Bi)	2	27.964	13.982	61.847	0.0001	9947
YexSe	1	1.1405	1.1405	3.8783	0.188	7124
YexCo	1	1.8603E-3	1.8603E-3	7.364E-3	0.8839	7198
YexBi	1	0.1555	0.1555	0.29875	0.6365	780
SexCo	1	2.2647E-2	2.2647E-2	9.6052E-2	0.7786	7097
SexBi	1	0.24008	0.24008	11.874	0.0946	800
CoxBi	1	6.3557	6.3557	211.67	0.0769	793
YexRe(Bi)	2	1.041	0.52049	2.3023	0.1201	9961
SexRe(Bi)	2	4.0438E-2	2.0219E-2	8.9435E-2	0.9169	9952
CoxRe(Bi)	2	6.0053E-2	3.0027E-2	0.13282	0.8742	9941
YexSexCo	1	1.0605	1.0605	1.434	0.359	9481
YexSexBi	1	2.1941E-2	2.1941E-2	7.4609E-2	0.7889	7116
YexCoxBi	1	6.9214E-3	6.9214E-3	2.7399E-2	0.8738	7156
SexCoxBi	1	0.18033	0.18033	0.76484	0.4738	7120
YexSexRe(Bi)	2	0.58816	0.29408	1.3008	0.2944	9943
YexCoxRe(Bi)	2	0.50523	0.25262	1.1174	0.342	9952
SexCoxRe(Bi)	2	0.47155	0.23578	1.0429	0.3745	9944
YexSexCoxBi	1	4.7605E-2	4.7605E-2	6.4373E-2	0.8244	9478
YexSexCoxRe(Bi)	2	1.479	0.73952	3.2711	0.0531	9947
Res	32	7.2344	0.22608			
Total	63	77.014				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	9.8003E-2	0.31305
S(Se)	0.16269	0.40334
S(Co)	0.30312	0.55057
S(Bi)	-0.13119	-0.36221
V(Re(Bi))	0.85975	0.92723
S(YexSe)	5.2902E-2	0.23
S(YexCo)	-1.5672E-2	-0.12519
S(YexBi)	-2.2812E-2	-0.15104
S(SexCo)	-1.3321E-2	-0.11541
S(SexBi)	1.3742E-2	0.11722
S(CoxBi)	0.39536	0.62877
V(YexRe(Bi))	3.6802E-2	0.19184
V(SexRe(Bi))	-2.5732E-2	-0.16041
V(CoxRe(Bi))	-2.4506E-2	-0.15654
S(YexSexCo)	4.0122E-2	0.2003
S(YexSexBi)	-3.4017E-2	-0.18444
S(YexCoxBi)	-3.0712E-2	-0.17525
S(SexCoxBi)	-6.9307E-3	-8.3251E-2
V(YexSexRe(Bi))	1.7001E-2	0.13039
V(YexCoxRe(Bi))	6.6348E-3	8.1455E-2
V(SexCoxRe(Bi))	2.4249E-3	4.9244E-2
S(YexSexCoxBi)	-0.17298	-0.41591
V(YexSexCoxRe(Bi))	0.25672	0.50668
V(Res)	0.22608	0.47547

PERMANOVA – Region A, 4th root transformed filter feeder abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.21087	0.21087	0.43758	0.5277	9803
Se	1	1.7064	1.7064	3.5409	0.1016	9825
Co	1	7.5745	7.5745	15.718	0.006	9795
YexSe	1	1.166	1.166	2.4195	0.157	9830
YexCo	1	7.869E-3	7.869E-3	1.6329E-2	0.8955	9818
SexCo	1	0.12071	0.12071	0.25049	0.6288	9821
YexSexCo	1	1.0827E-2	1.0827E-2	2.2468E-2	0.8811	9793
Res	8	3.8553	0.48191			
Total	15	14.652				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-3.3879E-2	-0.18406
S(Se)	0.15306	0.39123
S(Co)	0.88658	0.94158
S(YexSe)	0.17101	0.41354
S(YexCo)	-0.11851	-0.34425
S(SexCo)	-9.0299E-2	-0.3005
S(YexSexCo)	-0.23554	-0.48533
V(Res)	0.48191	0.6942

PERMANOVA – Region B, 4th root transformed filter feeder abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	3.4127	3.4127	13.523	0.0084	9823
Se	1	2.1603	2.1603	8.5603	0.0198	9806
Co	1	8.3415	8.3415	33.054	0.001	9796
YexSe	1	1.8571E-2	1.8571E-2	7.3589E-2	0.7859	9820
YexCo	1	4.6239E-2	4.6239E-2	0.18323	0.6791	9823
SexCo	1	0.38639	0.38639	1.5311	0.2485	9850
YexSexCo	1	1.828	1.828	7.2437	0.0315	9810
Res	8	2.0189	0.25236			
Total	15	18.213				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.39504	0.62852
S(Se)	0.23849	0.48835
S(Co)	1.0111	1.0056
S(YexSe)	-5.8447E-2	-0.24176
S(YexCo)	-5.153E-2	-0.227
S(SexCo)	3.3508E-2	0.18305
S(YexSexCo)	0.78783	0.8876
V(Res)	0.25236	0.50235

PERMANOVA (Pairwise) – Region B, 4th root transformed filter feeder abundance data (Euclidean distance).

Term 'YexSexCo' for pairs of levels of factor 'Year'

Within level 'W' of factor 'Season'
Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	3.449	0.3298	3

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	2

Average Distance between/within groups

	1	2
1	0.61633	
2	1.424	0.54959

Within level 'W' of factor 'Season'
Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	0.39705	1	3

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	2

Average Distance between/within groups

	1	2
1	0.35419	
2	0.70086	1.4017

Within level 'S' of factor 'Season'
Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	0.80633	0.6658	3

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	2

Average Distance between/within groups

	1	2
1	0.18828	
2	0.27147	0.48105

Within level 'S' of factor 'Season'
Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	3.553	0.3293	3

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	2

Average Distance between/within groups

	1	2
1	0.97433	
2	1.7753	0.22217

Term 'YexSexCo' for pairs of levels of factor 'Season'

Within level '1' of factor 'Year'
Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	5.1318	0.3323	3

Denominators

Groups	Denominator	Den.df
W, S	1*Res	2

Average Distance between/within groups

	W	S
W	0.61633	
S	1.6536	0.18828

Within level '1' of factor 'Year'
Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	0.61747	0.6656	3

Denominators

Groups	Denominator	Den.df
W, S	1*Res	2

Average Distance between/within groups

	W	S
W	0.35419	
S	0.49216	0.97433

Within level '2' of factor 'Year'
Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	1.1988	0.6662	3

Denominators

Groups	Denominator	Den.df
W, S	1*Res	2

Average Distance between/within groups

	W	S
W	0.54959	
S	0.47657	0.48105

Within level '2' of factor 'Year'
Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	1.6463	0.3342	3

Denominators

Groups	Denominator	Den.df
W, S	1*Res	2

Average Distance between/within groups

	W	S
W	1.4017	
S	1.1683	0.22217

Term 'YexSexCo' for pairs of levels of factor 'Condition'

Within level '1' of factor 'Year'
Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	6.5369	0.3309	3

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	2

Average Distance between/within groups

	N-U	U
N-U	0.61633	
U	2.3234	0.35419

Within level '1' of factor 'Year'
Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	0.70487	1	3

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	2

Average Distance between/within groups

	N-U	U
N-U	0.18828	
U	0.48717	0.97433

Within level '2' of factor 'Year'
Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	1.5759	0.3337	3

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	2

Average Distance between/within groups

	N-U	U
N-U	0.54959	
U	1.1864	1.4017

Within level '2' of factor 'Year'
Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	7.2349	0.3322	3

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	2

Average Distance between/within groups

	N-U	U
N-U	0.48105	
U	1.9168	0.22217

PERMANOVA – Region C, 4th root transformed filter feeder abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.31591	0.31591	3.5146	0.097	9820
Se	1	1.029	1.029	11.448	0.0097	9800
Co	1	0.21023	0.21023	2.3388	0.1702	9868
YexSe	1	0.52903	0.52903	5.8856	0.0399	9784
YexCo	1	0.21076	0.21076	2.3447	0.1605	9849
SexCo	1	6.5387E-2	6.5387E-2	0.72745	0.4281	9763
YexSexCo	1	0.7456	0.7456	8.2951	0.0197	9815
Res	8	0.71908	8.9885E-2			
Total	15	3.825				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	2.8253E-2	0.16809
S(Se)	0.11739	0.34262
S(Co)	1.5043E-2	0.12265
S(YexSe)	0.10979	0.33134
S(YexCo)	3.0218E-2	0.17383
S(SexCo)	-6.1245E-3	-7.8259E-2
S(YexSexCo)	0.32786	0.57259
V(Res)	8.9885E-2	0.29981

PERMANOVA (Pairwise) – Region C, 4th root transformed filter feeder abundance data (Euclidean distance).

Term 'YexSexCo' for pairs of levels of factor 'Year'

Within level 'W' of factor 'Season'
Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
1, 2	2.2763	0.3322	3	0.1519

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	2

Average Distance between/within groups

	1	2
1	0.22472	
2	0.28484	0.11015

Within level 'W' of factor 'Season'
Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
1, 2	0.97901	0.662	3	0.4366

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	2

Average Distance between/within groups

	1	2
1	0.19775	
2	0.14506	0.14336

Within level 'S' of factor 'Season'
Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
1, 2	5.9992	0.3359	3	0.0273

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	2

Average Distance between/within groups

	1	2
1	0.13881	
2	1.306	0.41267

Within level 'S' of factor 'Season'
Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
1, 2	3.1249E-2	1	3	0.981

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	2

Average Distance between/within groups

	1	2
1	6.2906E-2	
2	0.52971	1.0594

Term 'YexSexCo' for pairs of levels of factor 'Season'

Within level '1' of factor 'Year'
Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
W, S	1.2142	0.6599	3	0.3443

Denominators

Groups	Denominator	Den.df
W, S	1*Res	2

Average Distance between/within groups

	W	S
W	0.22472	
S	0.17106	0.13881

Within level '1' of factor 'Year'
Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
W, S	4.3122	0.3261	3	0.0486

Denominators

Groups	Denominator	Den.df
W, S	1*Res	2

Average Distance between/within groups

	W	S
W	0.19775	
S	0.44741	6.2906E-2

Within level '2' of factor 'Year'
Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
W, S	6.6982	0.3348	3	0.0213

Denominators

Groups	Denominator	Den.df
W, S	1*Res	2

Term 'YexSexCo' for pairs of levels of factor 'Condition'

Within level '1' of factor 'Year'
Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms	P(MC)
U, N-U	2.0285	0.336	3	0.1802

Denominators

Groups	Denominator	Den.df
U, N-U	1*Res	2

Average Distance between/within groups

	U	N-U
U	0.22472	
N-U	0.3036	0.19775

Within level '1' of factor 'Year'
Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms	P(MC)
U, N-U	3.9918	0.3288	3	0.0568

Denominators

Groups	Denominator	Den.df
U, N-U	1*Res	2

Average Distance between/within groups

	U	N-U
U	0.13881	
N-U	0.30418	6.2906E-2

Within level '2' of factor 'Year'
Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms	P(MC)
U, N-U	1.1151	0.6708	3	0.3829

Denominators

Groups	Denominator	Den.df
U, N-U	1*Res	2

Average Distance between/within groups

	U	N-U
U	0.11015	
N-U	0.11378	0.14336

Within level '2' of factor 'Year'
Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms	P(MC)
U, N-U	1.7914	0.3314	3	0.2092

Denominators

Groups	Denominator	Den.df
U, N-U	1*Res	2

Average Distance between/within groups

	U	N-U
U	0.41267	
N-U	1.0184	1.0594

PERMANOVA – Region D, 4th root transformed filter feeder abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.91362	0.91362	11.399	0.0096	9749
Se	1	0.61107	0.61107	7.6242	0.0266	9408
Co	1	1.9524E-2	1.9524E-2	0.2436	0.6345	9777
YexSe	1	3.7048E-2	3.7048E-2	0.46224	0.5083	9777
YexCo	1	0.24915	0.24915	3.1086	0.12	9722
SexCo	1	0.10204	0.10204	1.2731	0.2852	9772
YexSexCo	1	2.6899E-3	2.6899E-3	3.3562E-2	0.8447	9740
Res	8	0.64119	8.0148E-2			
Total	15	2.5763				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.10418	0.32278
S(Se)	6.6365E-2	0.25761
S(Co)	-7.578E-3	-8.7052E-2
S(YexSe)	-1.0775E-2	-0.1038
S(YexCo)	4.225E-2	0.20555
S(SexCo)	5.4721E-3	7.3974E-2
S(YexSexCo)	-3.8729E-2	-0.1968
V(Res)	8.0148E-2	0.28311

PERMDISP – Region A, 4th root transformed filter feeder abundance data (Euclidean distance).

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.58547 df1: 1 df2: 14
P(perm): 0.4673

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.76516	0.4739

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	0.49053	0.13952
U	8	0.63316	0.12361

PERMDISP – Region B, 4th root transformed filter feeder abundance data (Euclidean distance).

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.10298 df1: 1 df2: 14
P(perm): 0.7675

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.32091	0.7657

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	0.63884	0.16189
U	8	0.70794	0.14199

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.21717 df1: 1 df2: 14
P(perm): 0.6527

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.46601	0.6506

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.90478	0.23553
S	8	0.76869	0.17267

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.35618 df1: 1 df2: 14
P(perm): 0.5373

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.59681	0.5342

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	0.74754	0.21893
2	8	0.9031	0.14146

PERMDISP – Region C, 4th root transformed filter feeder abundance data (Euclidean distance).

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 18.36 df1: 1 df2: 14
P(perm): 0.0002

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	4.2849	4E-4

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	0.16002	3.7188E-2
2	8	0.5863	9.2271E-2

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 12.28 df1: 1 df2: 14
P(perm): 0.0017

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	3.5043	2.1E-3

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.11675	3.487E-2
S	8	0.50149	0.10411

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 2.1772 df1: 1 df2: 14
P(perm): 0.2817

PAIRWISE COMPARISONS

Groups	t	P(perm)
(U,N-U)	1.4755	0.2954

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
U	8	0.48526	0.12215
N-U	8	0.27675	7.104E-2

<u>PERMDISP – Region D, 4th root transformed filter feeder abundance data (Euclidean distance).</u>

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.10736 df1: 1 df2: 14
P(perm): 0.7344

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.32766	0.7468

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	0.26505	6.0181E-2
2	8	0.29319	6.127E-2

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 1.9379E-3 df1: 1 df2: 14
P(perm): 0.9785

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	4.4022E-2	0.978

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.28227	7.0403E-2
S	8	0.28708	8.3556E-2

ANOSIM – Region A, 4th root transformed filter feeder abundance data (Euclidean distance).

Condition
Global Test
Sample statistic (Global R): 0.384
Significance level of sample statistic: 0.6%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 5

ANOSIM – Region B, 4th root transformed filter feeder abundance data (Euclidean distance).

Condition (across Winter, Y1)
Global Test
Sample statistic (Global R): 1
Significance level of sample statistic: 33.3%
Number of permutations: 3 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Condition (across Summer, Y2)
Global Test
Sample statistic (Global R): 1
Significance level of sample statistic: 33.3%
Number of permutations: 3 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Season (across Non-upwelling, Y1)
Global Test
Sample statistic (Global R): 1
Significance level of sample statistic: 33.3%
Number of permutations: 3 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

ANOSIM – Region C, 4th root transformed filter feeder abundance data (Euclidean distance).

Season (across Non-upwelling, Y1)
Global Test
Sample statistic (Global R): 1
Significance level of sample statistic: 33.3%
Number of permutations: 3 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Season (acrossUpwelling, Y2)
Global Test
Sample statistic (Global R): 1
Significance level of sample statistic: 33.3%
Number of permutations: 3 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Year (across Upwelling, Summer)
Global Test
Sample statistic (Global R): 1
Significance level of sample statistic: 33.3%
Number of permutations: 3 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

PERMANOVA – All sites, 4th root transformed both develeopmental mode abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	386.15	386.15	2.3146	0.2258	798
Se	1	92.598	92.598	0.36103	0.7199	800
Co	1	52.347	52.347	0.68369	0.4097	800
Bi	1	8596.6	8596.6	12.282	0.334	3
Re(Bi)	2	1399.9	699.94	21.009	0.0001	9951
YexSe	1	54.453	54.453	0.83201	0.4889	7115
YexCo	1	7.9246	7.9246	0.21081	0.4728	7156
YexBi	1	48.083	48.083	0.28822	0.6999	801
SexCo	1	2.8487	2.8487	2.9114E-2	0.8642	7094
SexBi	1	102.75	102.75	0.40063	0.6948	796
CoxBi	1	106.29	106.29	1.3882	0.3272	800
YexRe(Bi)	2	333.66	166.83	5.0074	0.0013	9942
SexRe(Bi)	2	512.97	256.48	7.6983	0.0002	9965
CoxRe(Bi)	2	153.13	76.565	2.2981	0.0703	9957
YexSexCo	1	55.174	55.174	2.1451	0.2397	9518
YexSexBi	1	53.432	53.432	0.81642	0.5121	7147
YexCoxBi	1	106.5	106.5	2.8332	0.1884	7136
SexCoxBi	1	0.27393	0.27393	2.7996E-3	0.8457	7054
YexSexRe(Bi)	2	130.89	65.447	1.9644	0.1047	9961
YexCoxRe(Bi)	2	75.183	37.592	1.1283	0.3489	9965
SexCoxRe(Bi)	2	195.69	97.846	2.9368	0.0227	9938
YexSexCoxBi	1	30.501	30.501	1.1858	0.3565	9488
YexSexCoxRe(Bi)	2	51.443	25.721	0.77203	0.5684	9958
Res	32	1066.1	33.317			
Total	63	13615				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	6.8537	2.618
S(Se)	-5.1214	-2.2631
S(Co)	-0.75683	-0.86996
S(Bi)	246.77	15.709
V(Re(Bi))	41.664	6.4548
S(YexSe)	-0.68715	-0.82894
S(YexCo)	-1.8542	-1.3617
S(YexBi)	-7.4216	-2.7243
S(SexCo)	-5.9373	-2.4367
S(SexBi)	-9.6081	-3.0997
S(CoxBi)	1.8578	1.363
V(YexRe(Bi))	16.689	4.0852
V(SexRe(Bi))	27.896	5.2817
V(CoxRe(Bi))	5.4061	2.3251
S(YexSexCo)	3.6816	1.9187
S(YexSexBi)	-1.5019	-1.2255
S(YexCoxBi)	8.614	2.935
S(SexCoxBi)	-12.196	-3.4923
V(YexSexRe(Bi))	8.0326	2.8342
V(YexCoxRe(Bi))	1.0687	1.0338
V(SexCoxRe(Bi))	16.132	4.0165
S(YexSexCoxBi)	1.195	1.0931
V(YexSexCoxRe(Bi))	-3.7977	-1.9488
V(Res)	33.317	5.7721

PERMANOVA – Region A, 4th root transformed both develeopmental mode abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	74.487	74.487	3.0973	0.0693	9928
Se	1	150.03	150.03	6.2386	0.0056	9932
Co	1	-12.177	-12.177	Negative		
YexSe	1	15.876	15.876	0.66018	0.5778	9937
YexCo	1	42.13	42.13	1.7518	0.1988	9927
SexCo	1	87.682	87.682	3.646	0.0456	9927
YexSexCo	1	-17	-17	Negative		
Res	8	192.39	24.049			
Total	15	533.42				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	6.3047	2.5109
S(Se)	15.748	3.9683
S(Co)	-4.5282	-2.128
S(YexSe)	-2.0431	-1.4294
S(YexCo)	4.5202	2.1261
S(SexCo)	15.908	3.9885
S(YexSexCo)	-20.524	-4.5304
V(Res)	24.049	4.9039

PERMANOVA (pairwise) – Region A, 4th root transformed both develeopmental mode abundance data (Euclidean distance).

Term 'SexCo' for pairs of levels of factor 'Season'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	3.445	0.0278	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	92.538	
S	89.409	94.86

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	1.127	0.3637	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	92.74	
S	93.093	93.352

Term 'SexCo' for pairs of levels of factor 'Condition'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	1.1233	0.3407	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	92.538	
U	92.535	92.74

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	1.515	0.1851	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	94.86	
U	93.806	93.352

PERMANOVA – Region B, 4th root transformed both develeopmental mode abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	503.91	503.91	11.874	0.0046	9930
Se	1	-0.47425	-0.47425	Negative		
Co	1	270.11	270.11	6.365	0.0187	9921
YexSe	1	20.508	20.508	0.48326	0.645	9936
YexCo	1	1.4963	1.4963	3.526E-2	0.9075	9926
SexCo	1	17.912	17.912	0.42208	0.6826	9933
YexSexCo	1	110.24	110.24	2.5977	0.1143	9920
Res	8	339.49	42.437			
Total	15	1263.2				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	57.684	7.595
S(Se)	-5.3639	-2.316
S(Co)	28.459	5.3347
S(YexSe)	-5.4821	-2.3414
S(YexCo)	-10.235	-3.1992
S(SexCo)	-6.1313	-2.4761
S(YexSexCo)	33.901	5.8224
V(Res)	42.437	6.5144

PERMANOVA – Region C, 4th root transformed both develeopmental mode abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	173.47	173.47	3.6167	0.0749	9922
Se	1	105.58	105.58	2.2013	0.1559	9922
Co	1	29.311	29.311	0.61111	0.5273	9926
YexSe	1	182.04	182.04	3.7954	0.0734	9927
YexCo	1	110.74	110.74	2.3088	0.1561	9922
SexCo	1	35.635	35.635	0.74297	0.4516	9919
YexSexCo	1	37.783	37.783	0.78774	0.4192	9904
Res	8	383.71	47.963			
Total	15	1058.3				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	15.688	3.9609
S(Se)	7.2023	2.6837
S(Co)	-2.3315	-1.5269
S(YexSe)	33.519	5.7896
S(YexCo)	15.693	3.9615
S(SexCo)	-3.082	-1.7556
S(YexSexCo)	-5.0902	-2.2562
V(Res)	47.963	6.9255

PERMANOVA – Region D, 4th root transformed both develeopmental mode abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	16.02	16.02	0.85132	0.4528	9939
Se	1	453.18	453.18	24.082	0.0006	9903
Co	1	24.523	24.523	1.3032	0.3293	9940
YexSe	1	20.354	20.354	1.0816	0.3789	9930
YexCo	1	35.25	35.25	1.8732	0.187	9927
SexCo	1	57.585	57.585	3.0601	0.0927	9926
YexSexCo	1	6.0972	6.0972	0.32401	0.7245	9928
Res	8	150.54	18.818			
Total	15	763.55				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-0.34974	-0.59139
S(Se)	54.295	7.3685
S(Co)	0.71319	0.8445
S(YexSe)	0.38388	0.61958
S(YexCo)	4.108	2.0268
S(SexCo)	9.6917	3.1132
S(YexSexCo)	-6.3604	-2.522
V(Res)	18.818	4.338

PERMDISP – Region A, 4th root transformed both develeopmental mode abundance data (Euclidean distance).

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.89669 df1: 1 df2: 14
P(perm): 0.359

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.94694	0.3536

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	4.9663	0.76956
S	8	4.0044	0.66316

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.28883 df1: 1 df2: 14
P(perm): 0.6218

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.53743	0.6237

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	5.4429	1.3254
U	8	4.591	0.86951

PERMDISP – Region B, 4th root transformed both develeopmental mode abundance data (Euclidean distance).

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 1.2549 df1: 1 df2: 14
P(perm): 0.2626

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	1.1202	0.2711

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	8.0112	1.6889
U	8	5.8272	0.97393

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.40399 df1: 1 df2: 14
P(perm): 0.5563

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.63561	0.5523

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	6.703	1.338
2	8	5.6723	0.91593

PERMDISP – Region D, 4th root transformed both develeopmental mode abundance data (Euclidean distance).

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 11.913 df1: 1 df2: 14
P(perm): 0.0113

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	3.4515	9E-3

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	4.3309	0.70415
S	8	9.2725	1.2466

ANOSIM – Region A, 4th root transformed both develeopmental mode abundance data (Euclidean distance).

Season (across Non-upwelling)
Global Test
Sample statistic (Global R): 0.594
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

ANOSIM – Region D, 4th root transformed both develeopmental mode abundance data (Euclidean distance).

Season

Global Test
Sample statistic (Global R): 0.759
Significance level of sample statistic: 0.2%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 1

PERMANOVA – All sites, 4th root transformed direct developer abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	2.6013	2.6013	14.182	0.0801	799
Se	1	0.38308	0.38308	0.38243	0.5776	800
Co	1	0.95141	0.95141	2.4003	0.2439	800
Bi	1	42.89	42.89	7.668	0.3408	3
Re(Bi)	2	11.187	5.5934	46.412	0.0001	9947
YexSe	1	0.26662	0.26662	1.5357	0.3468	7051
YexCo	1	7.9463E-2	7.9463E-2	3.6229	0.198	7124
YexBi	1	0.58731	0.58731	3.2018	0.1957	797
SexCo	1	8.4634E-3	8.4634E-3	3.8488E-2	0.8276	6764
SexBi	1	0.35712	0.35712	0.35652	0.5826	800
CoxBi	1	0.34272	0.34272	0.86466	0.4497	801
YexRe(Bi)	2	0.36686	0.18343	1.5221	0.233	9961
SexRe(Bi)	2	2.0034	1.0017	8.3117	0.0013	9956
CoxRe(Bi)	2	0.79272	0.39636	3.2889	0.0497	9955
YexSexCo	1	0.20018	0.20018	9.1826	0.0899	9485
YexSexBi	1	4.6033E-2	4.6033E-2	0.26515	0.6494	7176
YexCoxBi	1	0.46254	0.46254	21.088	0.059	7162
SexCoxBi	1	5.5014E-2	5.5014E-2	0.25018	0.6658	7119
YexSexRe(Bi)	2	0.34722	0.17361	1.4406	0.2526	9936
YexCoxRe(Bi)	2	4.3867E-2	2.1934E-2	0.182	0.8363	9957
SexCoxRe(Bi)	2	0.43979	0.2199	1.8246	0.1744	9961
YexSexCoxBi	1	0.22438	0.22438	10.293	0.0882	9480
YexSexCoxRe(Bi)	2	4.3599E-2	2.18E-2	0.18089	0.8336	9945
Res	32	3.8565	0.12051			
Total	63	68.536				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	7.5559E-2	0.27488
S(Se)	-1.9331E-2	-0.13904
S(Co)	1.7345E-2	0.1317
S(Bi)	1.1655	1.0796
V(Re(Bi))	0.34205	0.58485
S(YexSe)	5.8131E-3	7.6244E-2
S(YexCo)	3.5956E-3	5.9963E-2
S(YexBi)	2.5242E-2	0.15888
S(SexCo)	-1.3215E-2	-0.11495
S(SexBi)	-4.0285E-2	-0.20071
S(CoxBi)	-3.3527E-3	-5.7902E-2
V(YexRe(Bi))	7.8645E-3	8.8682E-2
V(SexRe(Bi))	0.11015	0.33188
V(CoxRe(Bi))	3.4481E-2	0.18569
S(YexSexCo)	2.2297E-2	0.14932
S(YexSexBi)	-1.5947E-2	-0.12628
S(YexCoxBi)	5.5076E-2	0.23468
S(SexCoxBi)	-2.061E-2	-0.14356
V(YexSexRe(Bi))	1.3273E-2	0.11521
V(YexCoxRe(Bi))	-2.4645E-2	-0.15699
V(SexCoxRe(Bi))	2.4845E-2	0.15762
S(YexSexCoxBi)	5.0644E-2	0.22504
V(YexSexCoxRe(Bi))	-4.9358E-2	-0.22217
V(Res)	0.12051	0.34715

PERMANOVA – Region A, 4th root transformed direct developer abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1.1973	1.1973	6.7052	0.0332	9804
Se	1	1.3628	1.3628	7.6319	0.0231	9805
Co	1	6.0654E-2	6.0654E-2	0.33968	0.5761	9817
YexSe	1	3.3516E-3	3.3516E-3	1.877E-2	0.8825	9822
YexCo	1	0.10556	0.10556	0.5912	0.4654	9855
SexCo	1	1.3735E-2	1.3735E-2	7.6922E-2	0.7935	9839
YexSexCo	1	0.23625	0.23625	1.3231	0.2893	9809
Res	8	1.4285	0.17856			
Total	15	4.4081				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.12734	0.35685
S(Se)	0.14803	0.38474
S(Co)	-1.4738E-2	-0.1214
S(YexSe)	-4.3802E-2	-0.20929
S(YexCo)	-1.8249E-2	-0.13509
S(SexCo)	-4.1206E-2	-0.20299
S(YexSexCo)	2.8843E-2	0.16983
V(Res)	0.17856	0.42256

PERMANOVA – Region B, 4th root transformed direct developer abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1.6513	1.6513	12.339	0.0094	9818
Se	1	2.416E-3	2.416E-3	1.8053E-2	0.8936	9792
Co	1	1.728	1.728	12.912	0.01	9823
YexSe	1	0.45294	0.45294	3.3845	0.0991	9795
YexCo	1	5.3739E-3	5.3739E-3	4.0155E-2	0.8408	9822
SexCo	1	6.4293E-4	6.4293E-4	4.8041E-3	0.9453	9825
YexSexCo	1	0.18926	0.18926	1.4142	0.2674	9806
Res	8	1.0706	0.13383			
Total	15	5.1006				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.18968	0.43552
S(Se)	-1.6427E-2	-0.12817
S(Co)	0.19927	0.4464
S(YexSe)	7.9778E-2	0.28245
S(YexCo)	-3.2114E-2	-0.1792
S(SexCo)	-3.3296E-2	-0.18247
S(YexSexCo)	2.7717E-2	0.16648
V(Res)	0.13383	0.36583

PERMANOVA – Region C, 4th root transformed direct developer abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.70691	0.70691	6.2316	0.0421	9797
Se	1	0.67148	0.67148	5.9193	0.0409	9799
Co	1	0.27905	0.27905	2.4599	0.1568	9782
YexSe	1	0.18662	0.18662	1.6451	0.2408	9777
YexCo	1	0.31265	0.31265	2.7561	0.1347	9842
SexCo	1	9.2053E-2	9.2053E-2	0.81147	0.3941	9805
YexSexCo	1	1.7501E-2	1.7501E-2	0.15428	0.6963	9811
Res	8	0.90752	0.11344			
Total	15	3.1738				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	7.4184E-2	0.27237
S(Se)	6.9755E-2	0.26411
S(Co)	2.0702E-2	0.14388
S(YexSe)	1.8295E-2	0.13526
S(YexCo)	4.9803E-2	0.22317
S(SexCo)	-5.3466E-3	-7.3121E-2
S(YexSexCo)	-4.7969E-2	-0.21902
V(Res)	0.11344	0.33681

PERMANOVA – Region D, 4th root transformed direct developer abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	3.2786E-5	3.2786E-5	5.8307E-4	0.979	9800
Se	1	0.7069	0.7069	12.572	0.009	9819
Co	1	1.9121E-2	1.9121E-2	0.34005	0.5809	9847
YexSe	1	1.6952E-2	1.6952E-2	0.30148	0.5953	9824
YexCo	1	0.16228	0.16228	2.8861	0.13	9814
SexCo	1	0.39684	0.39684	7.0575	0.0294	9834
YexSexCo	1	2.5142E-2	2.5142E-2	0.44714	0.5179	9800
Res	8	0.44983	5.6229E-2			
Total	15	1.7771				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-7.0246E-3	-8.3813E-2
S(Se)	8.1334E-2	0.28519
S(Co)	-4.6386E-3	-6.8107E-2
S(YexSe)	-9.8194E-3	-9.9093E-2
S(YexCo)	2.6514E-2	0.16283
S(SexCo)	8.5152E-2	0.29181
S(YexSexCo)	-1.5544E-2	-0.12467
V(Res)	5.6229E-2	0.23713

PERMDISP – Region A, 4th root transformed direct developer abundance data (Euclidean distance).

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.47839 df1: 1 df2: 14
P(perm): 0.4884

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.69166	0.4851

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	0.42271	9.659E-2
2	8	0.33614	7.9613E-2

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.43683 df1: 1 df2: 14
P(perm): 0.4924

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.66093	0.5017

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.40899	9.562E-2
S	8	0.32765	7.749E-2

PERMDISP – Region B, 4th root transformed direct developer abundance data (Euclidean distance).

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.32845 df1: 1 df2: 14
P(perm): 0.5485

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.57311	0.5672

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	0.36156	0.10449
2	8	0.43406	7.1316E-2

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.16488 df1: 1 df2: 14
P(perm): 0.6937

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.40605	0.6878

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	0.34389	0.11841
U	8	0.40171	7.9081E-2

PERMDISP – Region C, 4th root transformed direct developer abundance data (Euclidean distance).

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 8.6362E-2 df1: 1 df2: 14
P(perm): 0.8098

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.29387	0.806

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	0.31286	4.6895E-2
2	8	0.34629	0.10363

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 4.7625 df1: 1 df2: 14
P(perm): 0.1436

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	2.1823	0.1495

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.23966	5.9804E-2
S	8	0.44187	7.0777E-2

PERMDISP – Region D, 4th root transformed direct developer abundance data (Euclidean distance).

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 4.7625 df1: 1 df2: 14
P(perm): 0.1373

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	2.1823	0.1418

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.23966	5.9804E-2
S	8	0.44187	7.0777E-2

PERMANOVA – All sites, 4th root transformed indirect developer abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	2.4794	2.4794	1.4218	0.3629	796
Se	1	5.9243E-2	5.9243E-2	6.1446E-2	0.6079	767
Co	1	0.14819	0.14819	0.23259	0.6673	799
Bi	1	42.296	42.296	7.1939	0.3347	3
Re(Bi)	2	11.759	5.8794	28.64	0.0001	9948
YexSe	1	0.59687	0.59687	3.7281	0.1882	7139
YexCo	1	0.11857	0.11857	0.29634	0.6418	7052
YexBi	1	1.0781	1.0781	0.61828	0.5208	801
SexCo	1	0.61115	0.61115	2.047	0.2849	7115
SexBi	1	1.087	1.087	1.1274	0.3892	779
CoxBi	1	1.022	1.022	1.6041	0.3302	801
YexRe(Bi)	2	3.4876	1.7438	8.4943	0.0008	9954
SexRe(Bi)	2	1.9283	0.96416	4.6966	0.0163	9939
CoxRe(Bi)	2	1.2742	0.63712	3.1036	0.0588	9956
YexSexCo	1	0.80435	0.80435	2.6694	0.2439	9466
YexSexBi	1	0.35401	0.35401	2.2112	0.2661	7134
YexCoxBi	1	0.10104	0.10104	0.25251	0.67	7069
SexCoxBi	1	0.21464	0.21464	0.71894	0.4847	7110
YexSexRe(Bi)	2	0.3202	0.1601	0.77989	0.4708	9940
YexCoxRe(Bi)	2	0.80025	0.40012	1.9491	0.1542	9947
SexCoxRe(Bi)	2	0.5971	0.29855	1.4543	0.2544	9947
YexSexCoxBi	1	0.30898	0.30898	1.0254	0.4277	9455
YexSexCoxRe(Bi)	2	0.60264	0.30132	1.4678	0.252	9944
Res	32	6.5692	0.20529			
Total	63	78.618				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	2.2987E-2	0.15161
S(Se)	-2.8279E-2	-0.16816
S(Co)	-1.5279E-2	-0.12361
S(Bi)	1.138	1.0668
V(Re(Bi))	0.35463	0.59551
S(YexSe)	2.7298E-2	0.16522
S(YexCo)	-1.7597E-2	-0.13265
S(YexBi)	-4.1602E-2	-0.20397
S(SexCo)	1.9537E-2	0.13978
S(SexBi)	7.6795E-3	8.7633E-2
S(CoxBi)	2.4055E-2	0.1551
V(YexRe(Bi))	0.19231	0.43853
V(SexRe(Bi))	9.4859E-2	0.30799
V(CoxRe(Bi))	5.3979E-2	0.23233
S(YexSexCo)	6.2879E-2	0.25076
S(YexSexBi)	2.4239E-2	0.15569
S(YexCoxBi)	-3.7386E-2	-0.19335
S(SexCoxBi)	-1.0489E-2	-0.10242
V(YexSexRe(Bi))	-1.1297E-2	-0.10629
V(YexCoxRe(Bi))	4.8709E-2	0.2207
V(SexCoxRe(Bi))	2.3316E-2	0.1527
S(YexSexCoxBi)	1.9147E-3	4.3757E-2
V(YexSexCoxRe(Bi))	4.8017E-2	0.21913
V(Res)	0.20529	0.45309

PERMANOVA – Region A, 4th root transformed indirect developer abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1.0534E-3	1.0534E-3	6.2842E-3	0.9179	9749
Se	1	1.205	1.205	7.1885	0.0317	9732
Co	1	9.1464E-3	9.1464E-3	5.4564E-2	0.7877	9772
YexSe	1	9.6269E-2	9.6269E-2	0.57431	0.4643	9773
YexCo	1	0.36209	0.36209	2.1601	0.1793	9819
SexCo	1	1.3362	1.3362	7.9713	0.0244	9758
YexSexCo	1	4.4904E-2	4.4904E-2	0.26788	0.6083	9775
Res	8	1.341	0.16763			
Total	15	4.3957				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-2.0822E-2	-0.1443
S(Se)	0.12967	0.3601
S(Co)	-1.981E-2	-0.14075
S(YexSe)	-1.7839E-2	-0.13356
S(YexCo)	4.8615E-2	0.22049
S(SexCo)	0.29215	0.54051
S(YexSexCo)	-6.1362E-2	-0.24771
V(Res)	0.16763	0.40942

PERMANOVA (Pairwise) – Region A, 4th root transformed indirect developer abundance data (Euclidean distance).

Term 'SexCo' for pairs of levels of factor 'Season'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	3.9592	0.0379	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Distance between/within groups

	W	S
W	0.54935	
S	1.1268	0.36891

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	9.8919E-2	0.8732	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Distance between/within groups

	W	S
W	0.49767	
S	0.42704	0.5373

Term 'SexCo' for pairs of levels of factor 'Condition'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	1.8394	0.1567	267

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	0.54935	
U	0.65914	0.49767

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	2.3275	0.0967	269

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	0.36891	
U	0.5683	0.5373

PERMANOVA – Region B, 4th root transformed indirect developer abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	6.6589	6.6589	14.565	0.0067	9793
Se	1	8.9108E-2	8.9108E-2	0.19491	0.6694	9786
Co	1	2.2247	2.2247	4.8662	0.0611	9818
YexSe	1	1.7606E-2	1.7606E-2	3.8511E-2	0.8517	9829
YexCo	1	0.33092	0.33092	0.72383	0.4164	9817
SexCo	1	7.9396E-3	7.9396E-3	1.7367E-2	0.8982	9831
YexSexCo	1	1.5396	1.5396	3.3677	0.107	9841
Res	8	3.6574	0.45717			
Total	15	14.526				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.77521	0.88046
S(Se)	-4.6008E-2	-0.21449
S(Co)	0.22094	0.47004
S(YexSe)	-0.10989	-0.3315
S(YexCo)	-3.1564E-2	-0.17766
S(SexCo)	-0.11231	-0.33512
S(YexSexCo)	0.54122	0.73568
V(Res)	0.45717	0.67614

PERMANOVA – Region C, 4th root transformed indirect developer abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.37885	0.37885	2.1983	0.1781	9822
Se	1	2.2563E-3	2.2563E-3	1.3092E-2	0.9091	9817
Co	1	5.1661E-2	5.1661E-2	0.29976	0.6035	9839
YexSe	1	1.0343	1.0343	6.0016	0.0388	9828
YexCo	1	0.31702	0.31702	1.8395	0.2151	9805
SexCo	1	7.7071E-2	7.7071E-2	0.4472	0.514	9813
YexSexCo	1	0.13102	0.13102	0.76023	0.4079	9831
Res	8	1.3787	0.17234			
Total	15	3.371				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	2.5814E-2	0.16067
S(Se)	-2.1261E-2	-0.14581
S(Co)	-1.5085E-2	-0.12282
S(YexSe)	0.2155	0.46422
S(YexCo)	3.617E-2	0.19018
S(SexCo)	-2.3818E-2	-0.15433
S(YexSexCo)	-2.0661E-2	-0.14374
V(Res)	0.17234	0.41514

PERMANOVA (Pairwise) – Region C, 4th root transformed indirect developer abundance data (Euclidean distance).

Term 'YexSe' for pairs of levels of factor 'Year'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
1, 2	0.86567	0.4055	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Distance between/within groups

	1	2
1	0.27623	
2	0.34731	0.47378

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
1, 2	2.3706	0.1013	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Distance between/within groups

	1	2
1	0.36742	
2	0.89408	0.69092

Term 'YexSe' for pairs of levels of factor 'Season'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	4.541	0.0294	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Distance between/within groups

	W	S
W	0.27623	
S	0.53226	0.36742

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	1.2172	0.2835	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Distance between/within groups

	W	S
W	0.47378	
S	0.68683	0.69092

PERMANOVA – Region D, 4th root transformed indirect developer abundance data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	6.2806E-3	6.2806E-3	0.26153	0.6237	9801
Se	1	1.7782	1.7782	74.049	0.0005	9738
Co	1	0.15896	0.15896	6.6192	0.0303	9842
YexSe	1	0.12288	0.12288	5.1169	0.0509	9826
YexCo	1	9.833E-3	9.833E-3	0.40946	0.5347	9823
SexCo	1	1.6687E-3	1.6687E-3	6.9487E-2	0.7997	9809
YexSexCo	1	4.3969E-4	4.3969E-4	1.8309E-2	0.891	9802
Res	8	0.19212	2.4015E-2			
Total	15	2.2704				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-2.2167E-3	-4.7082E-2
S(Se)	0.21928	0.46827
S(Co)	1.6868E-2	0.12988
S(YexSe)	2.4716E-2	0.15721
S(YexCo)	-3.5454E-3	-5.9543E-2
S(SexCo)	-5.5865E-3	-7.4743E-2
S(YexSexCo)	-1.1787E-2	-0.10857
V(Res)	2.4015E-2	0.15497

PERMDISP – Region A, 4th root transformed indirect developer abundance data (Euclidean distance).

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 1.2556E-2 df1: 1 df2: 14
P(perm): 0.9173

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.11205	0.9235

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.358	0.11941
S	8	0.34137	8.81E-2

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 3.3089 df1: 1 df2: 14
P(perm): 0.0836

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	1.819	8.35E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	0.56342	0.12063
U	8	0.31242	6.6981E-2

PERMDISP – Region B, 4th root transformed indirect developer abundance data (Euclidean distance).

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 1.8093E-2 df1: 1 df2: 14
P(perm): 0.9092

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.13451	0.914

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	0.58205	0.16697
2	8	0.60867	0.10622

PERMDISP – Region C, 4th root transformed indirect developer abundance data (Euclidean distance).

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 1.8666 df1: 1 df2: 14
P(perm): 0.2106

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	1.3662	0.2106

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	0.27039	8.5303E-2
2	8	0.43973	8.9921E-2

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 6.5534 df1: 1 df2: 14
P(perm): 0.0214

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	2.56	2.27E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.25457	5.0017E-2
S	8	0.52656	9.3738E-2

PERMDISP – Region D, 4th root transformed indirect developer abundance data (Euclidean distance).

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 8.0373 df1: 1 df2: 14
P(perm): 0.0122

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	2.835	1.29E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.20488	1.9455E-2
S	8	9.6721E-2	3.2819E-2

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 7.0462E-2 df1: 1 df2: 14
P(perm): 0.7826

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.26545	0.7877

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	0.32316	5.7595E-2
U	8	0.34359	5.1023E-2

ANOSIM – Region A, 4th root transformed indirect developer abundance data (Euclidean distance).

Season (across Non-upwelling)
Global Test
Sample statistic (Global R): 0.833
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

ANOSIM – Region D, 4th root transformed indirect developer abundance data (Euclidean distance).

Season
Global Test
Sample statistic (Global R): 0.86
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 0

DistLM – Abundance data

Group variables, Indicator: Type
Selection criterion: AIC
Selection procedure: Specified

GROUPS

1	Slope	Exclude
2	BI	Trial
3	Gs	Exclude
4	Up	Trial
5	Lat	Trial
6	Sea	Trial

Total SS(trace): 1.1034E5

MARGINAL TESTS

Group	SS(trace)	Pseudo-F	P	Prop.	res.df	regr.df
BI	13483	8.6311	0.0001	0.1222	62	2
Up	4121	2.4055	0.0472	3.7349E-2	62	2
Lat	44210	41.45	0.0001	0.40068	62	2
Sea	2022.9	1.1579	0.3015	1.8333E-2	62	2

NO STARTING TERMS

SEQUENTIAL TESTS

Group	AIC	SS(trace)	Pseudo-F	P	Prop.	Cumul.	res.df	regr.df
+BI	472.61	13483	8.6311	0.0001	0.1222	0.1222	62	2
+Up	472.95	2485.6	1.6066	0.1478	2.2527E-2	0.14473	61	3
+Lat	435.78	43194	50.642	0.0001	0.39147	0.53619	60	4
+Sea	436.17	1272.1	1.504	0.1485	1.1529E-2	0.54772	59	5

Specified solution

AIC	R^2	RSS	No.Groups	Selections
436.17	0.54772	49904	4	2,4-6

Percentage of variation explained by individual axes

	% explained variation out of fitted model		% explained variation out of total variation	
Axis	Individual	Cumulative	Individual	Cumulative
1	73.46	73.46	40.24	40.24
2	20.91	94.37	11.45	51.69
3	4.35	98.73	2.38	54.07
4	1.27	100	0.7	54.77

PERMANOVA – All sites, 4th root transformed species biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1578	1578	1.9678	0.2382	799
Se	1	1405.8	1405.8	1.0291	0.4296	799
Co	1	2699.9	2699.9	0.83146	0.518	801
Bi	1	41192	41192	2.618	0.3299	3
Re(Bi)	2	31468	15734	42.632	0.0001	9929
YexSe	1	842.36	842.36	2.7582	0.1702	7133
YexCo	1	364.13	364.13	0.54182	0.6491	7163
YexBi	1	1413.9	1413.9	1.7632	0.2587	799
SexCo	1	614.12	614.12	0.96277	0.4511	7178
SexBi	1	994.61	994.61	0.72805	0.5704	801
CoxBi	1	2325.7	2325.7	0.71621	0.5417	800
YexRe(Bi)	2	1603.8	801.91	2.1728	0.0085	9934
SexRe(Bi)	2	2732.2	1366.1	3.7016	0.0001	9936
CoxRe(Bi)	2	6494.4	3247.2	8.7985	0.0001	9939
YexSexCo	1	625.79	625.79	1.9148	0.2722	9493
YexSexBi	1	493.25	493.25	1.6151	0.3183	7213
YexCoxBi	1	507.08	507.08	0.75451	0.5552	7208
SexCoxBi	1	686.72	686.72	1.0766	0.4195	7185
YexSexRe(Bi)	2	610.81	305.41	0.82752	0.6435	9937
YexCoxRe(Bi)	2	1344.1	672.06	1.821	0.0354	9935
SexCoxRe(Bi)	2	1275.7	637.87	1.7284	0.0597	9918
YexSexCoxBi	1	496.17	496.17	1.5182	0.3219	9480
YexSexCoxRe(Bi)	2	653.63	326.81	0.88553	0.5866	9937
Res	32	11810	369.06			
Total	63	1.1423E5				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	24.253	4.9247
S(Se)	1.2412	1.1141
S(Co)	-17.103	-4.1355
S(Bi)	795.56	28.206
V(Re(Bi))	960.31	30.989
S(YexSe)	33.56	5.7931
S(YexCo)	-19.246	-4.387
S(YexBi)	38.251	6.1847
S(SexCo)	-1.4843	-1.2183
S(SexBi)	-23.219	-4.8187
S(CoxBi)	-57.595	-7.5891
V(YexRe(Bi))	54.106	7.3557
V(SexRe(Bi))	124.63	11.164
V(CoxRe(Bi))	359.77	18.968
S(YexSexCo)	37.372	6.1133
S(YexSexBi)	23.481	4.8457
S(YexCoxBi)	-20.623	-4.5413
S(SexCoxBi)	6.1061	2.471
V(YexSexRe(Bi))	-15.914	-3.9892
V(YexCoxRe(Bi))	75.75	8.7035
V(SexCoxRe(Bi))	67.203	8.1977
S(YexSexCoxBi)	42.34	6.5069
V(YexSexCoxRe(Bi))	-21.123	-4.596
V(Res)	369.06	19.211

PERMANOVA (Pairwise) – All sites, 4th root transformed species biomass data.

Term 'YexCoxRe(Bi)' for pairs of levels of factor 'Region'

Within level '1' of factor 'Year'
Within level 'N-U' of factor 'Condition'
Within level 'West' of factor 'Biogeography'

Groups	t	P(perm)	Unique perms	P(MC)
B, A	4.7716	0.0294	270	0.0021

Denominators

Groups	Denominator	Den.df
B, A	1*Res	4

Average Similarity between/within groups

	B	A
B	61.979	
A	33.744	80.531

Within level '1' of factor 'Year'
Within level 'N-U' of factor 'Condition'
Within level 'South' of factor 'Biogeography'

Groups	t	P(perm)	Unique perms	P(MC)
D, C	2.8112	0.0294	269	0.01

Denominators

Groups	Denominator	Den.df
D, C	1*Res	4

Average Similarity between/within groups

	D	C
D	51.232	
C	43.962	85.23

Within level '1' of factor 'Year'
Within level 'U' of factor 'Condition'
Within level 'West' of factor 'Biogeography'

Groups	t	P(perm)	Unique perms	P(MC)
B, A	3.5626	0.0269	270	0.0055

Denominators

Groups	Denominator	Den.df
B, A	1*Res	4

Average Similarity between/within groups

	B	A
B	69.996	
A	47.221	72.621

Within level '1' of factor 'Year'
Within level 'U' of factor 'Condition'
Within level 'South' of factor 'Biogeography'

Groups	t	P(perm)	Unique perms	P(MC)
D, C	2.8844	0.0268	269	0.0095

Denominators

Groups	Denominator	Den.df
D, C	1*Res	4

Average Similarity between/within groups

	D	C
D	61.836	
C	48.888	76.57

Within level '2' of factor 'Year'
Within level 'N-U' of factor 'Condition'
Within level 'West' of factor 'Biogeography'

Groups	t	P(perm)	Unique perms	P(MC)
B, A	7.2332	0.0311	269	0.0002

Denominators

Groups	Denominator	Den.df
B, A	1*Res	4

Average Similarity between/within groups

	B	A
B	76.971	
A	27.675	83.194

Within level '2' of factor 'Year'
Within level 'N-U' of factor 'Condition'
Within level 'South' of factor 'Biogeography'

Groups	t	P(perm)	Unique perms	P(MC)
D, C	2.8318	0.0338	270	0.0094

Denominators

Groups	Denominator	Den.df
D, C	1*Res	4

Average Similarity between/within groups

	D	C
D	53.95	
C	46.862	72.184

Within level '2' of factor 'Year'
Within level 'U' of factor 'Condition'
Within level 'West' of factor 'Biogeography'

Groups	t	P(perm)	Unique perms	P(MC)
B, A	5.2809	0.0272	270	0.0012

Denominators

Groups	Denominator	Den.df
B, A	1*Res	4

Average Similarity between/within groups

	B	A
B	75.725	
A	49.03	82.362

Within level '2' of factor 'Year'
Within level 'U' of factor 'Condition'
Within level 'South' of factor 'Biogeography'

Groups	t	P(perm)	Unique perms	P(MC)
D, C	2.5316	0.0301	270	0.0136

Denominators

Groups	Denominator	Den.df
D, C	1*Res	4

Average Similarity between/within groups

	D	C
D	62.37	
C	51.768	73.244

PERMANOVA – Region A, 4th root transformed species biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	479.6	479.6	3.1895	0.0281	9915
Se	1	506.27	506.27	3.3669	0.0287	9916
Co	1	5584.9	5584.9	37.141	0.0005	9901
YexSe	1	143.44	143.44	0.95393	0.4554	9920
YexCo	1	216.63	216.63	1.4407	0.2316	9936
SexCo	1	743.46	743.46	4.9443	0.0125	9937
YexSexCo	1	177.24	177.24	1.1787	0.3301	9920
Res	8	1202.9	150.37			
Total	15	9054.5				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	41.154	6.4152
S(Se)	44.488	6.6699
S(Co)	679.32	26.064
S(YexSe)	-1.7318	-1.316
S(YexCo)	16.566	4.0701
S(SexCo)	148.27	12.177
S(YexSexCo)	13.437	3.6657
V(Res)	150.37	12.262

PERMANOVA (Pairwise) – Region A, 4th root transformed species biomass data.

Term 'SexCo' for pairs of levels of factor 'Season'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	1.405	0.132	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	80.656	
S	79.371	80.442

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	2.5667	0.0275	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	81.333	
S	74.016	83.311

Term 'SexCo' for pairs of levels of factor 'Condition'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	5.1149	0.0281	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	80.656	
U	49.497	81.333

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	3.698	0.0284	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	80.442	
U	67.614	83.311

PERMANOVA – Region B, 4th root transformed species biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	2280.4	2280.4	6.3964	0.0034	9935
Se	1	1280.3	1280.3	3.5911	0.0147	9935
Co	1	3214.7	3214.7	9.017	0.0019	9910
YexSe	1	639.31	639.31	1.7932	0.144	9931
YexCo	1	971.06	971.06	2.7238	0.0366	9928
SexCo	1	460.45	460.45	1.2916	0.2937	9926
YexSexCo	1	301.53	301.53	0.84577	0.5096	9925
Res	8	2852.1	356.51			
Total	15	12000				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	240.48	15.507
S(Se)	115.47	10.746
S(Co)	357.27	18.902
S(YexSe)	70.699	8.4083
S(YexCo)	153.64	12.395
S(SexCo)	25.986	5.0976
S(YexSexCo)	-27.492	-5.2433
V(Res)	356.51	18.881

PERMANOVA (pairwise) – Region B, 4th root transformed species biomass data.

Term 'YexCo' for pairs of levels of factor 'Condition'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
N-U, U	2.4618	0.0323	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	61.979	
U	52.975	69.996

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
N-U, U	2.3595	0.0283	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	76.971	
U	65.502	75.725

Term 'YexCo' for pairs of levels of factor 'Year'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	2.7992	0.0294	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	61.979	
2	54.12	76.971

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	1.159	0.3012	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	69.996	
2	71.781	75.725

PERMANOVA – Region C, 4th root transformed species biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	464.33	464.33	1.9292	0.0998	9915
Se	1	838.09	838.09	3.482	0.0095	9917
Co	1	863.51	863.51	3.5876	0.0126	9928
YexSe	1	269.26	269.26	1.1187	0.3739	9924
YexCo	1	418.13	418.13	1.7372	0.1463	9924
SexCo	1	222.86	222.86	0.92592	0.4896	9922
YexSexCo	1	279.39	279.39	1.1608	0.3577	9925
Res	8	1925.5	240.69			
Total	15	5281.1				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	27.955	5.2872
S(Se)	74.675	8.6415
S(Co)	77.852	8.8234
S(YexSe)	7.1425	2.6725
S(YexCo)	44.361	6.6604
S(SexCo)	-4.4578	-2.1114
S(YexSexCo)	19.348	4.3986
V(Res)	240.69	15.514

PERMANOVA – Region D, 4th root transformed species biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1371.4	1371.4	1.8821	0.0961	9914
Se	1	2508	2508	3.4419	0.0085	9921
Co	1	1856.9	1856.9	2.5484	0.0325	9920
YexSe	1	894.42	894.42	1.2275	0.3119	9904
YexCo	1	609.51	609.51	0.83646	0.5548	9917
SexCo	1	1149.8	1149.8	1.5779	0.159	9907
YexSexCo	1	1017.4	1017.4	1.3963	0.251	9926
Res	8	5829.4	728.68			
Total	15	15237				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	80.346	8.9636
S(Se)	222.42	14.914
S(Co)	141.03	11.876
S(YexSe)	41.436	6.4371
S(YexCo)	-29.792	-5.4582
S(SexCo)	105.28	10.261
S(YexSexCo)	144.38	12.016
V(Res)	728.68	26.994

PERMDISP– Region A, 4th root transformed species biomass data.

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 7.9062E-2 df1: 1 df2: 14
P(perm): 0.7829

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.28118	0.7767

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	22.544	3.1253
2	8	21.466	2.2193

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 10.026 df1: 1 df2: 14
P(perm): 0.0107

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	3.1663	9.7E-3

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	26.422	1.7428
S	8	17.87	2.0634

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.53674 df1: 1 df2: 14
P(perm): 0.4995

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.73262	0.4897

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	13.328	1.4567
U	8	14.926	1.6226

PERMDISP– Region B, 4th root transformed species biomass data.

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 7.112 df1: 1 df2: 14
P(perm): 0.0293

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	2.6668	2.88E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	26.486	2.1325
U	8	18.089	2.3169

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 13.477 df1: 1 df2: 14
P(perm): 0.0017

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	3.6711	1.1E-3

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	27.91	1.8825
2	8	20.109	0.98597

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.40608 df1: 1 df2: 14
P(perm): 0.5906

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.63725	0.5944

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	26.193	2.3047
S	8	24.211	2.0884

PERMDISP– Region C, 4th root transformed species biomass data.

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.32892 df1: 1 df2: 14
P(perm): 0.6142
PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.57352	0.6116

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	15.386	1.0206
S	8	16.733	2.1163

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.27799 df1: 1 df2: 14
P(perm): 0.6431

PAIRWISE COMPARISONS

Groups	t	P(perm)
(U,N-U)	0.52725	0.6392

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
U	8	16.63	1.3871
N-U	8	15.387	1.9053

PERMDISP– Region D, 4th root transformed species biomass data.

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 5.8297 df1: 1 df2: 14
P(perm): 0.0244

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	2.4145	2.26E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	31.628	1.8158
U	8	24.835	2.1486

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.72776 df1: 1 df2: 14
P(perm): 0.43

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.85309	0.4384

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	26.634	1.7554
S	8	28.872	1.9491

ANOSIM – all sites, 4th root transformed species biomass data.

Global Test
Sample statistic (Global R): 0.921
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample from a large number)
Number of permuted statistics greater than or equal to Global R: 0

Pairwise Tests

Groups	R Statistic	Significance Level %	Possible Permutations	Actual Permutations	Number >= Observed
B, D	0.985	0.1	300540195	999	0
B, A	0.883	0.1	300540195	999	0
B, C	0.959	0.1	300540195	999	0
D, A	0.97	0.1	300540195	999	0
D, C	0.728	0.1	300540195	999	0
A, C	0.999	0.1	300540195	999	0

ANOSIM – Region A, 4th root transformed species biomass data.

Season (across Upwelling)
Global Test
Sample statistic (Global R): 0.698
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Condition (across Winter)
Global Test
Sample statistic (Global R): 1
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Condition (across Summer)
Global Test
Sample statistic (Global R): 0.854
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

ANOSIM – Region B, 4th root transformed species biomass data.

Year (across Non-upwelling)
Global Test
Sample statistic (Global R): 0.75
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Condition (across Y1)
Global Test
Sample statistic (Global R): 0.656
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Condition (across Y2)
Global Test
Sample statistic (Global R): 0.906
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

ANOSIM – Region C, 4th root transformed species biomass data.

Condition
Global Test
Sample statistic (Global R): 0.255
Significance level of sample statistic: 0.4%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 3

ANOSIM – Region D, 4th root transformed species biomass data.

Condition
Global Test
Sample statistic (Global R): 0.21
Significance level of sample statistic: 1.7%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 16

SIMPER – Region A, 4th root transformed species biomass data.

Condition
Group N-U
Average similarity: 79.88

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
T.granulatus	7.32	24.26	9.34	30.37	30.37
E.natalensis	5.91	19.25	6.14	24.10	54.47
A.quadrispinosa	4.27	14.47	6.19	18.11	72.58
P.latipes	4.32	13.84	5.48	17.32	89.91
G.latipes	1.43	3.49	1.47	4.37	94.28

Group U
Average similarity: 77.58

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
P.latipes	4.81	14.92	5.75	19.23	19.23
E.natalensis	3.13	9.78	5.13	12.60	31.84
E.longicornis	3.21	9.30	2.87	11.98	43.82
G.latipes	2.94	8.76	5.62	11.29	55.11
A.quadrispinosa	3.18	8.56	2.59	11.03	66.14
E.kensleyi	2.62	7.87	9.88	10.14	76.28
G.psammodytes	2.51	7.20	3.50	9.28	85.57
Nemertean	2.43	6.27	1.64	8.09	93.65

Groups N-U & U
Average dissimilarity = 41.44

	Group N-U	Group U				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
T.granulatus	7.32	2.71	8.29	1.71	20.00	20.00
E.longicornis	0.00	3.21	5.80	3.22	14.00	33.99
E.natalensis	5.91	3.13	5.03	1.95	12.15	46.14
E.kensleyi	0.30	2.62	4.15	3.75	10.02	56.17
Nemertean	0.56	2.43	3.62	1.70	8.73	64.90
G.latipes	1.43	2.94	2.81	1.77	6.79	71.69
G.psammodytes	1.19	2.51	2.56	1.56	6.17	77.86
A.quadrispinosa	4.27	3.18	2.41	1.15	5.80	83.66
P.latipes	4.32	4.81	2.07	1.41	4.99	88.65
Amph A	0.58	0.07	0.98	1.47	2.36	91.01

SIMPER – Region B, 4th root transformed species biomass data.

Examines Condition groups
(across all Year groups)
Group N-U
Average similarity: 69.47

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
D.serra	6.10	12.54	2.60	18.05	18.05
E.natalensis	3.89	10.97	2.26	15.80	33.85
A.quadrispinosa	2.76	7.37	3.37	10.61	44.46
Nemertean	4.21	6.44	1.08	9.27	53.73
G.benguellana	2.30	5.47	5.91	7.87	61.59
E.longicornis	2.27	5.03	2.17	7.23	68.83
S.squamata	2.73	4.72	2.05	6.80	75.63
G.psammodytes	1.89	4.24	1.60	6.10	81.73
E.kensleyi	2.04	3.71	2.94	5.34	87.07
B.digitalis	3.42	3.68	0.65	5.29	92.36

Group U
Average similarity: 72.86

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
D.serra	9.73	14.92	3.53	20.47	20.47
G.psammodytes	3.95	6.22	5.78	8.54	29.02
E.kensleyi	3.24	5.34	3.50	7.33	36.35
A.quadrispinosa	3.17	5.07	5.84	6.96	43.31
E.natalensis	3.00	4.62	3.17	6.34	49.65
E.longicornis	2.76	4.21	3.50	5.78	55.43
P.latipes	3.11	4.14	1.57	5.68	61.11
T.granulatus	3.95	3.94	1.26	5.40	66.51
G.benguellana	3.05	3.61	1.37	4.96	71.47
S.capense	3.07	3.46	0.91	4.74	76.21
B.digitalis	3.73	3.24	1.03	4.45	80.66
S.squamata	2.68	3.02	1.51	4.14	84.80
N.capense	2.19	2.85	1.61	3.91	88.72
Nemertean	2.13	2.35	1.57	3.23	91.95

Groups N-U & U
Average dissimilarity = 40.76

Species	Group N-U Av.Abund	Group U Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
D.serra	6.10	9.73	5.70	1.35	13.99	13.99
T.granulatus	0.00	3.95	4.29	1.34	10.52	24.51
B.digitalis	3.42	3.73	3.09	1.22	7.59	32.10
Nemertean	4.21	2.13	2.90	1.62	7.11	39.22
S.capense	1.05	3.07	2.84	1.38	6.97	46.19
P.latipes	0.81	3.11	2.71	1.48	6.66	52.85
G.psammodytes	1.89	3.95	2.17	1.71	5.31	58.16
E.kensleyi	2.04	3.24	1.75	1.33	4.30	62.46
G.benguellana	2.30	3.05	1.55	1.69	3.80	66.27
Orbina B	0.00	1.39	1.49	3.11	3.66	69.92
S.squamata	2.73	2.68	1.34	1.39	3.29	73.21
N.capense	1.80	2.19	1.21	1.15	2.97	76.18
E.longicornis	2.27	2.76	1.11	1.34	2.73	78.91
E.natalensis	3.89	3.00	0.99	1.31	2.44	81.35
Ovalipes	0.46	0.53	0.93	0.56	2.29	83.64
P.herdmani	0.21	0.97	0.91	1.84	2.23	85.87
Cumacean A	1.14	1.49	0.90	1.19	2.20	88.08
A.quadrispinosa	2.76	3.17	0.60	1.06	1.47	89.55
B.laevissima	0.69	0.00	0.55	0.46	1.36	90.90

Examines Year groups
(across all Condition groups)
Group 1
Average similarity: 65.99

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
D.serra	6.40	13.25	2.44	20.07	20.07
E.natalensis	3.49	10.16	1.80	15.40	35.47
A.quadrispinosa	2.64	7.11	2.83	10.78	46.24
G.psammodytes	2.84	6.16	2.63	9.33	55.57
E.longicornis	2.72	6.00	3.61	9.09	64.66
E.kensleyi	2.30	4.77	2.29	7.23	71.89
G.benguellana	1.98	4.16	1.56	6.30	78.19
S.capense	2.35	2.74	0.68	4.15	82.34
S.squamata	1.52	2.53	1.44	3.84	86.18
T.granulatus	2.07	1.93	0.55	2.92	89.10
Nemertean	1.43	1.51	0.60	2.28	91.38

Group 2
Average similarity: 76.35

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
D.serra	9.43	14.21	3.78	18.62	18.62
Nemertean	4.90	7.28	1.54	9.54	28.16
B.digitalis	5.21	5.68	1.20	7.44	35.59
E.natalensis	3.40	5.44	2.85	7.12	42.72
A.quadrispinosa	3.30	5.33	8.84	6.98	49.70
S.squamata	3.89	5.21	2.64	6.82	56.52
G.benguellana	3.37	4.92	3.31	6.45	62.97
N.capense	2.95	4.31	5.96	5.64	68.61
G.psammodytes	3.00	4.31	2.49	5.64	74.25
E.kensleyi	2.97	4.28	4.56	5.61	79.86
E.longicornis	2.30	3.24	6.66	4.24	84.11
P.latipes	2.55	2.95	1.05	3.86	87.97
Cumacean A	1.90	2.55	4.37	3.35	91.31

Groups 1 & 2
Average dissimilarity = 37.05

Species	Group 1 Av.Abund	Group 2 Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
D.serra	6.40	9.43	5.24	1.33	14.16	14.16
B.digitalis	1.94	5.21	4.49	1.43	12.12	26.28
Nemertean	1.43	4.90	4.28	1.17	11.56	37.84
S.squamata	1.52	3.89	2.71	1.46	7.31	45.14
N.capense	1.04	2.95	2.19	1.40	5.91	51.05
S.capense	2.35	1.76	1.71	1.01	4.61	55.66
G.benguellana	1.98	3.37	1.60	1.36	4.31	59.98
P.latipes	1.37	2.55	1.44	1.01	3.89	63.87
Cumacean A	0.73	1.90	1.37	1.51	3.69	67.56
T.granulatus	2.07	1.87	1.28	0.72	3.46	71.01
E.kensleyi	2.30	2.97	1.23	1.15	3.31	74.32
G.psammodytes	2.84	3.00	1.09	1.84	2.94	77.26
E.longicornis	2.72	2.30	1.02	1.09	2.76	80.02
Ovalipes	0.46	0.53	0.93	0.56	2.51	82.53
B.laevissima	0.00	0.69	0.81	0.46	2.17	84.70
Cumacean B (H)	0.14	0.73	0.75	1.26	2.02	86.72
A.quadrispinosa	2.64	3.30	0.74	1.88	2.00	88.73
E.natalensis	3.49	3.40	0.61	1.52	1.64	90.37

SIMPER – Region C, 4th root transformed species biomass data.

Condition
Group U
Average similarity: 74.96

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
D.serra	9.00	23.25	4.50	31.01	31.01
B.rhodostoma	4.48	11.67	4.05	15.56	46.58
D.sordidus	3.75	10.84	9.25	14.46	61.04
E.natalensis	2.57	6.36	3.92	8.49	69.52
G.psammodytes	2.28	5.83	4.85	7.77	77.29
P.latipes	2.22	4.81	1.43	6.42	83.72
E.longicornis	1.74	4.77	4.46	6.36	90.08

Group N-U
Average similarity: 76.56

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
D.serra	6.90	21.04	3.67	27.48	27.48
E.natalensis	3.51	10.85	4.80	14.17	41.65
D.sordidus	3.20	9.70	6.59	12.67	54.32
B.rhodostoma	3.70	9.37	1.63	12.24	66.56
P.latipes	2.49	7.54	2.71	9.85	76.41
G.psammodytes	2.33	7.23	6.81	9.45	85.86
T.sp. nov	1.72	4.88	4.66	6.37	92.23

Groups U & N-U
Average dissimilarity = 27.08

Species	Group U Av.Abund	Group N-U Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
D.serra	9.00	6.90	4.84	1.32	17.88	17.88
B.rhodostoma	4.48	3.70	2.88	1.15	10.65	28.53
E.natalensis	2.57	3.51	2.03	1.48	7.51	36.04
G.incerta	0.00	1.15	1.84	1.18	6.78	42.82
E.longicornis np	1.20	0.41	1.74	1.41	6.41	49.23
B.pura	1.03	0.19	1.66	0.85	6.15	55.38
S.capense	1.03	0.00	1.64	0.75	6.05	61.43
P.latipes	2.22	2.49	1.64	1.00	6.04	67.47
D.sordidus	3.75	3.20	1.50	1.44	5.53	73.00
T.sp. nov	1.68	1.72	1.32	1.27	4.88	77.87
G.psammodytes	2.28	2.33	1.03	1.30	3.82	81.69
E.longicornis	1.74	1.47	1.02	1.09	3.78	85.47
L.tetraura	0.00	0.56	0.91	0.57	3.36	88.83
Cirratulid	0.20	0.17	0.52	0.53	1.91	90.74

SIMPER – Region D, 4th root transformed species biomass data.

Condition
Group N-U
Average similarity: 52.58

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
E.longicornis	2.46	9.62	5.03	18.29	18.29
B.rhodostoma	3.30	9.60	1.98	18.26	36.54
P.latipes	2.59	9.36	3.29	17.80	54.34
G.psammodytes	1.76	6.14	2.70	11.68	66.03
E.natalensis	1.72	5.28	1.12	10.04	76.07
E.longicornis np	1.43	3.02	0.94	5.75	81.82
L.tetraura	1.47	2.71	0.65	5.16	86.97
Nemertean	1.07	1.31	0.49	2.48	89.46
T.sp. nov	0.62	1.18	0.49	2.24	91.70

Group U
Average similarity: 62.24

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
P.latipes	2.42	9.83	5.70	15.79	15.79
B.rhodostoma	2.93	9.64	1.64	15.49	31.28
E.natalensis	2.54	9.55	4.52	15.35	46.63
E.longicornis	1.81	6.24	1.62	10.03	56.66
Bausto sp	1.19	4.63	5.27	7.44	64.10
G.psammodytes	1.39	3.97	1.04	6.38	70.48
E.longicornis np	1.20	3.47	1.47	5.58	76.06
D.sordidus	1.41	2.66	0.72	4.27	80.33
Isopod A	0.89	2.38	1.03	3.83	84.16
U.coxalis	0.71	2.30	1.50	3.70	87.85
Nemertean	0.90	2.06	0.72	3.31	91.16

Groups N-U & U
Average dissimilarity = 45.64

Species	Group N-U Av.Abund	Group U Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
B.rhodostoma	3.30	2.93	3.84	1.39	8.42	8.42
L.tetraura	1.47	0.86	2.97	1.25	6.52	14.93
D.sordidus	0.15	1.41	2.86	1.17	6.27	21.20
Bausto sp	0.16	1.19	2.35	2.48	5.16	26.36
E.natalensis	1.72	2.54	2.33	1.41	5.11	31.48
Nemertean	1.07	0.90	2.33	1.37	5.11	36.59
E.longicornis np	1.43	1.20	2.26	1.44	4.95	41.53
D.serra	0.53	0.85	1.99	1.18	4.36	45.89
Isopod A	0.61	0.89	1.83	1.45	4.02	49.91
G.psammodytes	1.76	1.39	1.82	1.09	3.98	53.90
T.sp. nov	0.62	0.86	1.66	1.17	3.64	57.54
E.longicornis	2.46	1.81	1.66	1.10	3.63	61.17
U.coxalis	0.49	0.71	1.51	1.84	3.30	64.47
S.capense	0.56	0.34	1.50	0.64	3.29	67.77
P.latipes	2.59	2.42	1.49	1.54	3.27	71.04
Orbiniidae A	0.72	0.16	1.47	0.74	3.21	74.25
Emerita	0.58	0.22	1.31	0.65	2.87	77.12
S.squamata	0.48	0.28	1.15	0.98	2.52	79.64
G.incerta	0.45	0.20	1.14	0.77	2.49	82.12
B.digitalis	0.30	0.34	1.13	0.51	2.47	84.59
N.capense	0.48	0.09	0.92	1.02	2.02	86.61
Tylos capensis	0.29	0.18	0.91	0.64	2.00	88.61
M.longimana	0.33	0.08	0.71	0.99	1.56	90.18

PERMANOVA – All sites, 4th root transformed order biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1140.8	1140.8	3.0661	0.1398	801
Se	1	638.92	638.92	0.66893	0.6104	801
Co	1	1183.6	1183.6	0.84419	0.4979	801
Bi	1	18040	18040	1.3469	0.6752	3
Re(Bi)	2	26788	13394	45.494	0.0001	9937
YexSe	1	963.48	963.48	11.4	0.0379	7139
YexCo	1	445.48	445.48	0.96285	0.464	7157
YexBi	1	1208.2	1208.2	3.2473	0.1733	801
SexCo	1	330.02	330.02	0.76175	0.3983	7156
SexBi	1	177.42	177.42	0.18575	0.7993	799
CoxBi	1	1407.3	1407.3	1.0037	0.4347	799
YexRe(Bi)	2	744.12	372.06	1.2637	0.2867	9938
SexRe(Bi)	2	1910.3	955.14	3.2442	0.0012	9946
CoxRe(Bi)	2	2804.2	1402.1	4.7623	0.0001	9946
YexSexCo	1	272.53	272.53	1.265	0.3706	9529
YexSexBi	1	174.12	174.12	2.0603	0.2304	7154
YexCoxBi	1	437.05	437.05	0.94463	0.462	7187
SexCoxBi	1	527.15	527.15	1.2168	0.3518	7097
YexSexRe(Bi)	2	169.03	84.514	0.28705	0.9253	9934
YexCoxRe(Bi)	2	925.33	462.67	1.5715	0.1493	9945
SexCoxRe(Bi)	2	866.48	433.24	1.4715	0.1872	9942
YexSexCoxBi	1	283.04	283.04	1.3138	0.362	9483
YexSexCoxRe(Bi)	2	430.88	215.44	0.73174	0.669	9946
Res	32	9421.4	294.42			
Total	63	71289				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	24.023	4.9013
S(Se)	-9.8819	-3.1435
S(Co)	-6.8267	-2.6128
S(Bi)	145.19	12.049
V(Re(Bi))	818.73	28.614
S(YexSe)	54.935	7.4118
S(YexCo)	-1.0743	-1.0365
S(YexBi)	52.257	7.2289
S(SexCo)	-6.4513	-2.5399
S(SexBi)	-48.607	-6.9719
S(CoxBi)	0.32658	0.57147
V(YexRe(Bi))	9.7053	3.1153
V(SexRe(Bi))	82.59	9.0879
V(CoxRe(Bi))	138.46	11.767
S(YexSexCo)	7.1362	2.6714
S(YexSexBi)	11.201	3.3468
S(YexCoxBi)	-3.202	-1.7894
S(SexCoxBi)	11.739	3.4262
V(YexSexRe(Bi))	-52.476	-7.244
V(YexCoxRe(Bi))	42.062	6.4855
V(SexCoxRe(Bi))	34.706	5.8912
S(YexSexCoxBi)	16.9	4.111
V(YexSexCoxRe(Bi))	-39.49	-6.2841
V(Res)	294.42	17.159

PERMANOVA – Region A, 4th root transformed order biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	618.71	618.71	4.461	0.0112	9937
Se	1	108.89	108.89	0.78508	0.5201	9934
Co	1	2176.6	2176.6	15.694	0.0007	9919
YexSe	1	234.29	234.29	1.6892	0.1761	9920
YexCo	1	132.15	132.15	0.95284	0.4338	9927
SexCo	1	221.23	221.23	1.5951	0.2067	9937
YexSexCo	1	170.25	170.25	1.2276	0.315	9928
Res	8	1109.5	138.69			
Total	15	4771.7				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	60.002	7.7461
S(Se)	-3.7259	-1.9303
S(Co)	254.74	15.961
S(YexSe)	23.898	4.8886
S(YexCo)	-1.6352	-1.2788
S(SexCo)	20.635	4.5426
S(YexSexCo)	15.78	3.9724
V(Res)	138.69	11.777

PERMANOVA – Region B, 4th root transformed order biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1969.5	1969.5	9.8986	0.0017	9927
Se	1	914.33	914.33	4.5953	0.012	9938
Co	1	1655.5	1655.5	8.3202	0.002	9920
YexSe	1	582.7	582.7	2.9285	0.0412	9927
YexCo	1	828.71	828.71	4.1649	0.016	9934
SexCo	1	269.25	269.25	1.3532	0.2858	9929
YexSexCo	1	235.46	235.46	1.1834	0.3472	9936
Res	8	1591.8	198.97			
Total	15	8047.3				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	221.32	14.877
S(Se)	89.42	9.4562
S(Co)	182.07	13.493
S(YexSe)	95.931	9.7945
S(YexCo)	157.43	12.547
S(SexCo)	17.57	4.1917
S(YexSexCo)	18.244	4.2713
V(Res)	198.97	14.106

PERMANOVA (Pairwise) – Region B, 4th root transformed order biomass data.

Term 'YexCo' for pairs of levels of factor 'Year'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
1, 2	3.6523	0.0295	270	0.0063

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	67.798	
2	58.37	83.699

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
1, 2	1.1772	0.2977	270	0.2907

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	77.485	
2	78.074	80.056

Term 'YexCo' for pairs of levels of factor 'Condition'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	2.691	0.0357	270	0.0131

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	67.798	
U	61.886	77.485

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	2.1826	0.034	270	0.0312

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	83.699	
U	74.858	80.056

PERMANOVA – Region C, 4th root transformed order biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	327.5	327.5	1.9657	0.1523	9935
Se	1	590.56	590.56	3.5445	0.0182	9928
Co	1	439.02	439.02	2.6349	0.0717	9927
YexSe	1	301.55	301.55	1.8099	0.1724	9926
YexCo	1	464.85	464.85	2.79	0.0631	9942
SexCo	1	115.06	115.06	0.69059	0.5696	9931
YexSexCo	1	115.46	115.46	0.69297	0.5482	9927
Res	8	1332.9	166.61			
Total	15	3686.9				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	20.111	4.4846
S(Se)	52.994	7.2797
S(Co)	34.051	5.8353
S(YexSe)	33.733	5.808
S(YexCo)	74.559	8.6348
S(SexCo)	-12.888	-3.59
S(YexSexCo)	-25.578	-5.0575
V(Res)	166.61	12.908

PERMANOVA – Region D, 4th root transformed order biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	177.33	177.33	0.26334	0.9075	9924
Se	1	1112.8	1112.8	1.6526	0.174	9930
Co	1	1124	1124	1.6692	0.169	9928
YexSe	1	188.1	188.1	0.27933	0.8962	9928
YexCo	1	382.15	382.15	0.5675	0.7127	9914
SexCo	1	1118.1	1118.1	1.6604	0.1665	9926
YexSexCo	1	465.27	465.27	0.69094	0.6235	9925
Res	8	5387.1	673.39			
Total	15	9955				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-62.008	-7.8745
S(Se)	54.93	7.4115
S(Co)	56.331	7.5054
S(YexSe)	-121.32	-11.015
S(YexCo)	-72.81	-8.5329
S(SexCo)	111.18	10.544
S(YexSexCo)	-104.06	-10.201
V(Res)	673.39	25.95

PERMDISP – Region A, 4th root transformed order biomass data.

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.42138 df1: 1 df2: 14
P(perm): 0.5439

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.64913	0.5403

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	15.916	2.4403
2	8	13.777	2.2143

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.31218 df1: 1 df2: 14
P(perm): 0.6475

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.55873	0.6499

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	12.597	1.9942
U	8	11.291	1.2178

PERMDISP – Region B, 4th root transformed order biomass data.

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 12.914 df1: 1 df2: 14
P(perm): 0.0081

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	3.5936	6.4E-3

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	23.487	1.9091
U	8	14.143	1.7653

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 14.736 df1: 1 df2: 14
P(perm): 0.0016

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	3.8387	9E-4

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	22.599	1.7258
2	8	14.847	1.0491

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 1.1357 df1: 1 df2: 14
P(perm): 0.3928

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	1.0657	0.3843

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	21.878	2.3359
S	8	18.427	2.2435

ANOSIM – Region A, 4th root transformed order biomass data.

Condition
Global Test
Sample statistic (Global R): 0.592
Significance level of sample statistic: 0.4%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 3

ANOSIM – Region B, 4th root transformed order biomass data.

Year (across Non-upwelling)
Global Test
Sample statistic (Global R): 0.76
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Condition (across Y1)
Global Test
Sample statistic (Global R): 0.625
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Condition (across Y2)
Global Test
Sample statistic (Global R): 0.708
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

SIMPER – Region A, 4th root transformed order biomass data.

Condition
Group N-U
Average similarity: 80.89

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Isopoda	8.44	50.18	8.71	62.04	62.04
Amphipoda	4.30	25.46	6.48	31.47	93.51

Group U
Average similarity: 82.88

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Isopoda	5.87	36.32	7.04	43.83	43.83
Amphipoda	3.79	21.18	5.49	25.56	69.39
Mysidae	2.51	13.37	3.59	16.14	85.53
Nemertea	2.43	11.68	1.63	14.09	99.61

Groups N-U & U
Average dissimilarity = 27.90

	Group N-U	Group U				
Species	Av.Abund	Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Isopoda	8.44	5.87	8.24	1.92	29.53	29.53
Nemertea	0.56	2.43	6.59	1.67	23.63	53.17
Mysidae	1.19	2.51	4.59	1.58	16.45	69.62
Amphipoda	4.30	3.79	3.03	1.23	10.86	80.48
Veneroida	0.44	0.00	1.28	0.37	4.59	85.07
Neogastropoda	0.00	0.41	1.28	0.57	4.58	89.64
Polychaetea	0.30	0.00	0.91	0.76	3.27	92.91

PERMANOVA – All sites, 4th root transformed phylum biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	701.63	701.63	1.7783	0.2518	800
Se	1	-53.636	-53.636	Negative		
Co	1	987.24	987.24	0.63444	0.5829	801
Bi	1	16393	16393	1.383	0.6647	3
Re(Bi)	2	23708	11854	65.511	0.0001	9962
YexSe	1	977.47	977.47	10.466	0.0407	7083
YexCo	1	102.26	102.26	0.19531	0.6031	7201
YexBi	1	958.38	958.38	2.4291	0.2111	800
SexCo	1	331.19	331.19	1.4046	0.2847	7219
SexBi	1	-158.1	-158.1	Negative		
CoxBi	1	486.87	486.87	0.31288	0.7105	799
YexRe(Bi)	2	789.08	394.54	2.1805	0.0947	9963
SexRe(Bi)	2	931.22	465.61	2.5732	0.0476	9959
CoxRe(Bi)	2	3112.2	1556.1	8.5998	0.0001	9963
YexSexCo	1	100.67	100.67	0.71682	0.477	9548
YexSexBi	1	150.13	150.13	1.6075	0.3009	7207
YexCoxBi	1	638.65	638.65	1.2198	0.3897	7051
SexCoxBi	1	219.16	219.16	0.92945	0.3762	7170
YexSexRe(Bi)	2	186.79	93.394	0.51615	0.6916	9960
YexCoxRe(Bi)	2	1047.2	523.58	2.8936	0.0339	9956
SexCoxRe(Bi)	2	471.59	235.79	1.3031	0.3275	9964
YexSexCoxBi	1	143.66	143.66	1.0229	0.3854	9549
YexSexCoxRe(Bi)	2	280.88	140.44	0.77615	0.5656	9968
Res	32	5790.2	180.94			
Total	63	58296				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	9.5965	3.0978
S(Se)	-16.226	-4.0282
S(Co)	-17.776	-4.2162
S(Bi)	141.86	11.91
V(Re(Bi))	729.55	27.01
S(YexSe)	55.255	7.4334
S(YexCo)	-26.332	-5.1315
S(YexBi)	35.24	5.9363
S(SexCo)	5.9625	2.4418
S(SexBi)	-38.982	-6.2435
S(CoxBi)	-66.826	-8.1747
V(YexRe(Bi))	26.7	5.1672
V(SexRe(Bi))	35.583	5.9652
V(CoxRe(Bi))	171.89	13.111
S(YexSexCo)	-4.9711	-2.2296
S(YexSexBi)	7.0924	2.6632
S(YexCoxBi)	14.384	3.7926
S(SexCoxBi)	-2.0794	-1.442
V(YexSexRe(Bi))	-21.887	-4.6784
V(YexCoxRe(Bi))	85.66	9.2553
V(SexCoxRe(Bi))	13.713	3.7031
S(YexSexCoxBi)	0.8041	0.89672
V(YexSexCoxRe(Bi))	-20.252	-4.5002
V(Res)	180.94	13.452

PERMANOVA – Region A, 4th root transformed phylum biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	542.15	542.15	4.3099	0.021	9932
Se	1	-143.18	-143.18	Negative		
Co	1	2511.8	2511.8	19.967	0.001	9932
YexSe	1	526.86	526.86	4.1883	0.0369	9935
YexCo	1	312.78	312.78	2.4865	0.1271	9931
SexCo	1	393.01	393.01	3.1243	0.0504	9930
YexSexCo	1	-21.783	-21.783	Negative		
Res	8	1006.3	125.79			
Total	15	5127.9				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	52.045	7.2142
S(Se)	-33.621	-5.7984
S(Co)	298.25	17.27
S(YexSe)	100.27	10.013
S(YexCo)	46.748	6.8372
S(SexCo)	66.804	8.1734
S(YexSexCo)	-73.788	-8.59
V(Res)	125.79	11.216

PERMANOVA (Pairwise) – Region A, 4th root transformed phylum biomass data.

Term 'YexSe' for pairs of levels of factor 'Year'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
1, 2	1.3325	0.2401	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	75.25	
2	76.572	73.026

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
1, 2	2.2722	0.0558	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	72.048	
2	72.852	86.079

Term 'YexSe' for pairs of levels of factor 'Season'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	0.71695	0.6307	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	75.25	
S	77.641	72.048

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	3.2338	0.0379	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	73.026	
S	77.496	86.079

PERMANOVA – Region B, 4th root transformed phylum biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1555.6	1555.6	13.985	0.0028	9937
Se	1	385.44	385.44	3.4651	0.0582	9939
Co	1	1219.6	1219.6	10.964	0.0039	9928
YexSe	1	455.5	455.5	4.095	0.0293	9942
YexCo	1	1253.7	1253.7	11.271	0.0028	9924
SexCo	1	134.59	134.59	1.21	0.3537	9948
YexSexCo	1	93.344	93.344	0.83918	0.5022	9924
Res	8	889.86	111.23			
Total	15	5987.6				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	180.54	13.437
S(Se)	34.276	5.8545
S(Co)	138.54	11.77
S(YexSe)	86.067	9.2772
S(YexCo)	285.62	16.9
S(SexCo)	5.8398	2.4166
S(YexSexCo)	-8.9443	-2.9907
V(Res)	111.23	10.547

PERMANOVA (Pairwise) – Region B, 4th root transformed phylum biomass data.

Term 'YexCo' for pairs of levels of factor 'Year'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	5.2574	0.0269	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	76.328	
2	60.113	89.831

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	0.78808	0.7356	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	84.143	
2	84.925	84.156

Term 'YexCo' for pairs of levels of factor 'Condition'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
N-U, U	3.9982	0.0274	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	76.328	
U	64.68	84.143

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
N-U, U	2.2484	0.0289	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	89.831	
U	80.416	84.156

Term 'YexSe' for pairs of levels of factor 'Year'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
1, 2	2.8415	0.0504	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	71.08	
2	71.085	81.107

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
1, 2	3.2054	0.0285	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	73.107	
2	72.775	84.863

Term 'YexSe' for pairs of levels of factor 'Season'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	2.3549	0.066	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	71.08	
S	70.787	73.107

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	1.2576	0.2572	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	81.107	
S	83.422	84.863

PERMANOVA – Region C, 4th root transformed phylum biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	358.5	358.5	2.8267	0.0982	9935
Se	1	208.7	208.7	1.6456	0.2361	9936
Co	1	473.76	473.76	3.7354	0.0577	9939
YexSe	1	163.03	163.03	1.2855	0.3214	9925
YexCo	1	166.43	166.43	1.3123	0.3104	9934
SexCo	1	162.55	162.55	1.2816	0.3265	9945
YexSexCo	1	135.81	135.81	1.0708	0.3806	9948
Res	8	1014.6	126.83			
Total	15	2683.4				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	28.959	5.3814
S(Se)	10.235	3.1992
S(Co)	43.366	6.5853
S(YexSe)	9.0511	3.0085
S(YexCo)	9.9007	3.1465
S(SexCo)	8.9296	2.9882
S(YexSexCo)	4.4918	2.1194
V(Res)	126.83	11.262

PERMANOVA – Region D, 4th root transformed phylum biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	-7.1294	-7.1294	Negative		
Se	1	268.52	268.52	0.74606	0.532	9925
Co	1	381.17	381.17	1.059	0.3968	9945
YexSe	1	169.01	169.01	0.46957	0.6502	9956
YexCo	1	55.159	55.159	0.15326	0.8492	9933
SexCo	1	331.79	331.79	0.92186	0.4443	9926
YexSexCo	1	317.83	317.83	0.88306	0.4665	9937
Res	8	2879.3	359.92			
Total	15	4395.7				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-45.881	-6.7735
S(Se)	-11.425	-3.3801
S(Co)	2.6561	1.6298
S(YexSe)	-47.728	-6.9085
S(YexCo)	-76.19	-8.7287
S(SexCo)	-7.0309	-2.6516
S(YexSexCo)	-21.045	-4.5875
V(Res)	359.92	18.972

PERMDISP – Region A, 4th root transformed phylum biomass data.

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.22454 df1: 1 df2: 14
P(perm): 0.6995

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.47386	0.7001

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	16.369	2.715
2	8	14.668	2.3464

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 9.8796E-2 df1: 1 df2: 14
P(perm): 0.8333

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.31432	0.8409

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	17.471	1.4473
S	8	16.372	3.184

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.34855 df1: 1 df2: 14
P(perm): 0.6507

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.59038	0.65

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	12.039	2.5156
U	8	10.016	2.3285

PERMDISP – Region B, 4th root transformed phylum biomass data.

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 22.342 df1: 1 df2: 14
P(perm): 0.0007

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	4.7268	5E-4

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	21.402	1.6513
U	8	9.7799	1.8217

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.1644 df1: 1 df2: 14
P(perm): 0.7597

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.40546	0.762

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	18.094	2.5743
S	8	16.576	2.7184

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 12.46 df1: 1 df2: 14
P(perm): 0.0032

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	3.5299	3.3E-3

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	19.661	1.9771
2	8	11.337	1.2852

ANOSIM – Region A, 4th root transformed phylum biomass data.

Condition
Global Test
Sample statistic (Global R): 0.575
Significance level of sample statistic: 0.2%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 1

Season (across Y2)
Global Test
Sample statistic (Global R): 0.198
Significance level of sample statistic: 22.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 8

ANOSIM – Region B, 4th root transformed phylum biomass data.

Year (across Non-upwelling)
Global Test
Sample statistic (Global R): 0.958
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Condition (across Y1)
Global Test
Sample statistic (Global R): 0.813
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Condition (across Y2)
Global Test
Sample statistic (Global R): 0.604
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

PERMANOVA – All sites, 4th root transformed all feeding guilds biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	472.67	472.67	0.79315	0.5105	800
Se	1	361.33	361.33	0.88727	0.4891	799
Co	1	1137.7	1137.7	1.1003	0.412	801
Bi	1	6414.7	6414.7	0.79676	0.6721	3
Re(Bi)	2	16102	8051	53.457	0.0001	9940
YexSe	1	231.74	231.74	4.9855	0.1393	7069
YexCo	1	291.23	291.23	0.92417	0.4132	7124
YexBi	1	1167.9	1167.9	1.9597	0.2456	801
SexCo	1	507.66	507.66	10.795	0.068	7118
SexBi	1	-22.756	-22.756	Negative		
CoxBi	1	968.43	968.43	0.93652	0.4231	797
YexRe(Bi)	2	1191.9	595.94	3.9569	0.0021	9959
SexRe(Bi)	2	814.49	407.24	2.704	0.0223	9957
CoxRe(Bi)	2	2068.1	1034.1	6.866	0.0001	9961
YexSexCo	1	116.01	116.01	3.1833	0.1445	9518
YexSexBi	1	233.2	233.2	5.0169	0.1364	7254
YexCoxBi	1	515.3	515.3	1.6352	0.3099	7110
SexCoxBi	1	165.13	165.13	3.5112	0.155	7101
YexSexRe(Bi)	2	92.966	46.483	0.30864	0.8371	9957
YexCoxRe(Bi)	2	630.26	315.13	2.0924	0.0741	9956

SexCoxRe(Bi)	2	94.058	47.029	0.31226	0.8367	9973
YexSexCoxBi	1	141.94	141.94	3.8949	0.1281	9501
YexSexCoxRe(Bi)	2	72.885	36.443	0.24197	0.8734	9964
Res	32	4819.4	150.61			
Total	63	38588				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-3.8521	-1.9627
S(Se)	-1.4347	-1.1978
S(Co)	3.24	1.8
S(Bi)	-51.133	-7.1508
V(Re(Bi))	493.78	22.221
S(YexSe)	11.579	3.4027
S(YexCo)	-1.4936	-1.2221
S(YexBi)	35.745	5.9787
S(SexCo)	28.79	5.3656
S(SexBi)	-26.875	-5.1841
S(CoxBi)	-4.1025	-2.0255
V(YexRe(Bi))	55.666	7.461
V(SexRe(Bi))	32.08	5.6639
V(CoxRe(Bi))	110.43	10.509
S(YexSexCo)	9.9457	3.1537
S(YexSexBi)	23.34	4.8311
S(YexCoxBi)	25.021	5.0021
S(SexCoxBi)	14.762	3.8422
V(YexSexRe(Bi))	-26.031	-5.102
V(YexCoxRe(Bi))	41.131	6.4134
V(SexCoxRe(Bi))	-25.894	-5.0887
S(YexSexCoxBi)	26.374	5.1356
V(YexSexCoxRe(Bi))	-57.082	-7.5552
V(Res)	150.61	12.272

PERMANOVA – Region A, 4th root transformed all feeding guilds biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	450.91	450.91	3.3234	0.0637	9932
Se	1	217.2	217.2	1.6009	0.2444	9929
Co	1	2648.8	2648.8	19.523	0.0011	9930
YexSe	1	118.3	118.3	0.87195	0.4888	9943
YexCo	1	1.3293	1.3293	9.7979E-3	0.8678	9930
SexCo	1	171.79	171.79	1.2662	0.3263	9937
YexSexCo	1	9.4393	9.4393	6.9572E-2	0.8637	9926
Res	8	1085.4	135.68			
Total	15	4703.2				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	39.404	6.2772
S(Se)	10.19	3.1922
S(Co)	314.15	17.724
S(YexSe)	-4.3435	-2.0841
S(YexCo)	-33.587	-5.7954
S(SexCo)	9.028	3.0047
S(YexSexCo)	-63.119	-7.9447
V(Res)	135.68	11.648

PERMANOVA – Region B, 4th root transformed all feeding guilds biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1809.5	1809.5	15.91	0.0024	9925
Se	1	366.16	366.16	3.2196	0.0673	9945
Co	1	834.16	834.16	7.3346	0.0087	9939
YexSe	1	136.92	136.92	1.2039	0.3293	9933
YexCo	1	973.24	973.24	8.5575	0.0085	9919
SexCo	1	99.039	99.039	0.87082	0.461	9941
YexSexCo	1	137.81	137.81	1.2117	0.3486	9943
Res	8	909.84	113.73			
Total	15	5266.7				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	211.97	14.559
S(Se)	31.554	5.6173
S(Co)	90.054	9.4897
S(YexSe)	5.7971	2.4077
S(YexCo)	214.88	14.659
S(SexCo)	-3.6728	-1.9165
S(YexSexCo)	12.04	3.4699
V(Res)	113.73	10.664

PERMANOVA (Pairwise) – Region B, 4th root transformed all feeding guilds biomass data.

Term 'YexCo' for pairs of levels of factor 'Year'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	4.9123	0.0318	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	81.543	
2	62.047	86.777

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	0.97575	0.4744	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	86.35	
2	84.997	84.281

Term 'YexCo' for pairs of levels of factor 'Condition'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
N-U, U	4.0121	0.031	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	81.543	
U	68.405	86.35

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
N-U, U	0.90357	0.528	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	86.777	
U	85.813	84.281

PERMANOVA – Region C, 4th root transformed all feeding guilds biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	386.16	386.16	2.0356	0.1597	9940
Se	1	247.41	247.41	1.3042	0.3125	9929
Co	1	528.69	528.69	2.787	0.0868	9933
YexSe	1	231.19	231.19	1.2187	0.3494	9926
YexCo	1	346.49	346.49	1.8265	0.1939	9938
SexCo	1	191.26	191.26	1.0082	0.4118	9948
YexSexCo	1	74.644	74.644	0.39348	0.6686	9948
Res	8	1517.6	189.7			
Total	15	3523.5				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	24.557	4.9555
S(Se)	7.2135	2.6858
S(Co)	42.374	6.5095
S(YexSe)	10.372	3.2206
S(YexCo)	39.196	6.2607
S(SexCo)	0.38912	0.62379
S(YexSexCo)	-57.529	-7.5848
V(Res)	189.7	13.773

PERMANOVA – Region D, 4th root transformed all feeding guilds biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	185.83	185.83	1.1379	0.3712	9930
Se	1	322.3	322.3	1.9735	0.1345	9934
Co	1	162.61	162.61	0.99568	0.4328	9927
YexSe	1	71.494	71.494	0.43777	0.7288	9919
YexCo	1	115.74	115.74	0.70867	0.5877	9937
SexCo	1	304.76	304.76	1.8661	0.1569	9921
YexSexCo	1	108.94	108.94	0.66705	0.6059	9933
Res	8	1306.5	163.32			
Total	15	2578.2				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	2.8148	1.6777
S(Se)	19.873	4.4579
S(Co)	-8.8285E-2	-0.29713
S(YexSe)	-22.955	-4.7912
S(YexCo)	-11.894	-3.4488
S(SexCo)	35.361	5.9465
S(YexSexCo)	-27.188	-5.2142
V(Res)	163.32	12.779

PERMDISP – Region A, 4th root transformed all feeding guilds biomass data.

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 5.0183 df1: 1 df2: 14
P(perm): 0.0969

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	2.2402	9.7E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	12.749	1.6607
U	8	7.2522	1.8061

PERMDISP – Region B, 4th root transformed all feeding guilds biomass data.

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 10.536 df1: 1 df2: 14
P(perm): 0.008

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	3.2458	9.7E-3

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	19.798	2.5524
U	8	9.7399	1.7573

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 9.9253 df1: 1 df2: 14
P(perm): 0.0094

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	3.1505	9.6E-3

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	17.299	1.9516
2	8	9.4698	1.5383

ANOSIM – Region A, 4th root transformed all feeding guilds biomass data.

Condition
Global Test
Sample statistic (Global R): 0.624
Significance level of sample statistic: 0.2%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 1

ANOSIM – Region B, 4th root transformed all feeding guilds biomass data.

Condition (across Y1)
Global Test
Sample statistic (Global R): 0.854
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Year (across Non-upwelling)
Global Test
Sample statistic (Global R): 0.948
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

SIMPER – Region A, 4th root transformed all feeding guilds biomass data.

Group N-U
Average similarity: 80.90

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Scavenger	8.62	64.59	7.77	79.83	79.83
Deposit	1.49	8.11	1.60	10.02	89.85
Filter	1.63	7.65	1.35	9.46	99.31

Group U
Average similarity: 88.52

Species	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Scavenger	6.08	42.22	9.17	47.69	47.69
Deposit	2.94	18.07	5.73	20.42	68.11
Filter	2.51	14.94	3.36	16.88	84.99
Predator	2.48	13.29	1.67	15.01	100.00

Groups N-U & U
Average dissimilarity = 28.11

Species	Group N-U Av.Abund	Group U Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
Scavenger	8.62	6.08	9.55	2.02	33.98	33.98
Predator	0.56	2.48	7.87	1.69	27.99	61.97
Deposit	1.49	2.94	5.82	1.65	20.70	82.67
Filter	1.63	2.51	4.87	1.38	17.33	100.00

PERMANOVA – All sites, 4th root transformed predator biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	15.238	15.238	5.9075	0.1292	800
Se	1	5.6527E-3	5.6527E-3	2.197E-3	0.8243	796
Co	1	0.41795	0.41795	7.6136E-2	0.7518	801
Bi	1	33.792	33.792	0.71204	0.6629	3
Re(Bi)	2	94.916	47.458	45.355	0.0001	9942
YexSe	1	0.12604	0.12604	4.3016E-2	0.811	7164
YexCo	1	8.0986E-4	8.0986E-4	2.6774E-4	0.9002	6877
YexBi	1	16.749	16.749	6.4936	0.1213	800
SexCo	1	1.8283	1.8283	0.55173	0.5328	7142
SexBi	1	0.28915	0.28915	0.11238	0.7537	800
CoxBi	1	5.56	5.56	1.0128	0.4292	799
YexRe(Bi)	2	5.1587	2.5794	2.465	0.101	9957
SexRe(Bi)	2	5.1458	2.5729	2.4589	0.1049	9949
CoxRe(Bi)	2	10.979	5.4895	5.2462	0.0118	9952
YexSexCo	1	0.22491	0.22491	0.46434	0.5616	9419
YexSexBi	1	0.14009	0.14009	4.7811E-2	0.8092	7092
YexCoxBi	1	7.401	7.401	2.4468	0.2559	7135
SexCoxBi	1	3.1635	3.1635	0.95464	0.4395	6705
YexSexRe(Bi)	2	5.8603	2.9302	2.8003	0.0756	9953
YexCoxRe(Bi)	2	6.0495	3.0247	2.8907	0.0739	9946
SexCoxRe(Bi)	2	6.6276	3.3138	3.167	0.0591	9946
YexSexCoxBi	1	0.63268	0.63268	1.3062	0.373	9422
YexSexCoxRe(Bi)	2	0.96873	0.48436	0.4629	0.6314	9951
Res	32	33.484	1.0464			
Total	63	254.76				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.39557	0.62894
S(Se)	-8.0226E-2	-0.28324
S(Co)	-0.15849	-0.3981
S(Bi)	-0.42706	-0.65349
V(Re(Bi))	2.9007	1.7031
S(YexSe)	-0.17526	-0.41864
S(YexCo)	-0.189	-0.43474
S(YexBi)	0.88562	0.94108
S(SexCo)	-9.2844E-2	-0.3047
S(SexBi)	-0.14273	-0.3778
S(CoxBi)	4.4082E-3	6.6395E-2
V(YexRe(Bi))	0.19162	0.43775
V(SexRe(Bi))	0.19081	0.43682
V(CoxRe(Bi))	0.55539	0.74525
S(YexSexCo)	-3.2432E-2	-0.18009
S(YexSexBi)	-0.34876	-0.59056
S(YexCoxBi)	0.54703	0.73962
S(SexCoxBi)	-1.8789E-2	-0.13707
V(YexSexRe(Bi))	0.47095	0.68626
V(YexCoxRe(Bi))	0.49459	0.70327
V(SexCoxRe(Bi))	0.56686	0.7529
S(YexSexCoxBi)	3.708E-2	0.19256
V(YexSexCoxRe(Bi))	-0.281	-0.5301
V(Res)	1.0464	1.0229

PERMANOVA – Region A, 4th root transformed predator biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	6.1794	6.1794	14.706	0.0053	9556
Se	1	0.41726	0.41726	0.99298	0.4032	9672
Co	1	14.703	14.703	34.99	0.0013	9356
YexSe	1	2.962	2.962	7.0488	0.0245	9744
YexCo	1	5.457E-2	5.457E-2	0.12986	0.6157	9630
SexCo	1	2.5802	2.5802	6.1401	0.0284	9724
YexSexCo	1	0.28218	0.28218	0.67151	0.5041	9677
Res	8	3.3617	0.42021			
Total	15	30.541				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.7199	0.84847
S(Se)	-3.6897E-4	-1.9209E-2
S(Co)	1.7854	1.3362
S(YexSe)	0.63545	0.79715
S(YexCo)	-9.1411E-2	-0.30234
S(SexCo)	0.53999	0.73484
S(YexSexCo)	-6.9018E-2	-0.26271
V(Res)	0.42021	0.64824

PERMANOVA (Pairwise) – Region A, 4th root transformed predator biomass data (Euclidean distance).

Term 'YexSe' for pairs of levels of factor 'Year'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
1, 2	2.8364	0.0493	88

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Distance between/within groups

	1	2
1	1.586	
2	1.5514	2.1541

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
1, 2	3.3174	0.0278	154

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Distance between/within groups

	1	2
1	1.2629	
2	2.1718	0.69697

Term 'YexSe' for pairs of levels of factor 'Season'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	0.84949	0.4928	88

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Distance between/within groups

	W	S
W	1.586	
S	1.2159	1.2629

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
W, S	8.4107	0.0307	154

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Distance between/within groups

	W	S
W	2.1541	
S	1.6443	0.69697

Term 'SexCo' for pairs of levels of factor 'Season'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	23.978	0.0254	14

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Distance between/within groups

	W	S
W	0	
S	1.1261	1.5328

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	0.74268	0.5525	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Distance between/within groups

	W	S
W	0.62284	
S	1.0598	1.7462

Term 'SexCo' for pairs of levels of factor 'Condition'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	20.178	0.028	24

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	0	
U	2.7204	0.62284

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	1.7571	0.1496	154

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	1.5328	
U	1.6772	1.7462

<u>PERMANOVA – Region B, 4th root transformed predator biomass data (Euclidean distance).</u>

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	30.363	30.363	17.35	0.0045	9817
Se	1	1.0919E-3	1.0919E-3	6.2391E-4	0.9684	9750
Co	1	0.68895	0.68895	0.39368	0.5343	9779
YexSe	1	2.896	2.896	1.6549	0.2318	9839
YexCo	1	8.5593	8.5593	4.8909	0.0613	9823
SexCo	1	4.1321	4.1321	2.3612	0.1665	9824
YexSexCo	1	0.72653	0.72653	0.41515	0.5342	9804
Res	8	14	1.75			
Total	15	61.368				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	3.5767	1.8912
S(Se)	-0.21862	-0.46757
S(Co)	-0.13264	-0.36419
S(YexSe)	0.2865	0.53526
S(YexCo)	1.7023	1.3047
S(SexCo)	0.59552	0.7717
S(YexSexCo)	-0.51175	-0.71537
V(Res)	1.75	1.3229

PERMANOVA – Region C, 4th root transformed predator biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.19922	0.19922	0.1525	0.704	9789
Se	1	3.2362	3.2362	2.4772	0.1522	9827
Co	1	0.3994	0.3994	0.30572	0.5811	9816
YexSe	1	0.10856	0.10856	8.3096E-2	0.7871	9821
YexCo	1	4.4192	4.4192	3.3827	0.1056	9831
SexCo	1	2.2779	2.2779	1.7436	0.2262	9815
YexSexCo	1	0.31213	0.31213	0.23892	0.636	9821
Res	8	10.451	1.3064			
Total	15	21.404				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-0.1384	-0.37202
S(Se)	0.24123	0.49115
S(Co)	-0.11338	-0.33671
S(YexSe)	-0.29946	-0.54723
S(YexCo)	0.7782	0.88215
S(SexCo)	0.24286	0.49281
S(YexSexCo)	-0.49713	-0.70508
V(Res)	1.3064	1.143

PERMANOVA – Region D, 4th root transformed predator biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.40374	0.40374	0.56957	0.4703	9822
Se	1	1.786	1.786	2.5196	0.1625	9816
Co	1	1.1653	1.1653	1.644	0.2347	9838
YexSe	1	0.15987	0.15987	0.22553	0.6437	9811
YexCo	1	0.41828	0.41828	0.59009	0.47	9835
SexCo	1	2.6293	2.6293	3.7093	0.0938	9833
YexSexCo	1	0.50548	0.50548	0.71311	0.4281	9791
Res	8	5.6708	0.70885			
Total	15	12.739				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-3.8139E-2	-0.19529
S(Se)	0.13464	0.36694
S(Co)	5.706E-2	0.23887
S(YexSe)	-0.13724	-0.37047
S(YexCo)	-7.2641E-2	-0.26952
S(SexCo)	0.48012	0.69291
S(YexSexCo)	-0.10168	-0.31888
V(Res)	0.70885	0.84193

PERMDISP – Region A, 4th root transformed predator biomass data (Euclidean distance).

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 3.2014E-2 df1: 1 df2: 14
P(perm): 0.8628

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.17892	0.8602

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	1.1253	0.11278
2	8	1.0716	0.27815

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.2082 df1: 1 df2: 14
P(perm): 0.6351

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.45628	0.6349

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	1.3602	0.1142
S	8	1.2624	0.18142

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.20878 df1: 1 df2: 14
P(perm): 0.6918

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.45693	0.6901

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	0.84459	0.18516
U	8	0.69124	0.27993

PERMDISP – Region B , 4th root transformed predator biomass data (Euclidean distance).

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 7.8677E-2 df1: 1 df2: 14
P(perm): 0.8381

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.28049	0.8282

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	1.1667	0.1516
2	8	1.2677	0.32655

ANOSIM – Region A, 4th root transformed predator biomass data (Euclidean distance).

Condition (across Winter)
Global Test
Sample statistic (Global R): 1
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Season (across Non-upwelling)
Global Test
Sample statistic (Global R): 0.125
Significance level of sample statistic: 42.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 15

Season (across Y2)
Global Test
Sample statistic (Global R): 0.083
Significance level of sample statistic: 42.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 15

Year (across Winter)
Global Test
Sample statistic (Global R): -0.135
Significance level of sample statistic: 65.7%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 23

Year (across Summer)
Global Test
Sample statistic (Global R): 0.51
Significance level of sample statistic: 8.6%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 3

ANOSIM – Region B, 4th root transformed predator biomass data (Euclidean distance).

Year
Global Test
Sample statistic (Global R): 0.352
Significance level of sample statistic: 0.2%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 1

PERMANOVA – All sites, 4th root transformed deposit feeder biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	11.112	11.112	4.0197	0.1725	799
Se	1	3.0399	3.0399	4.8107	0.1603	801
Co	1	5.661	5.661	3.5313	0.2043	797
Bi	1	44.456	44.456	10.277	0.3448	3
Re(Bi)	2	8.6513	4.3256	7.1981	0.0024	9955
YexSe	1	9.6578E-2	9.6578E-2	0.23022	0.6704	7126
YexCo	1	4.8171E-2	4.8171E-2	0.44622	0.5721	7127
YexBi	1	6.4247	6.4247	2.3242	0.2519	798
SexCo	1	0.58292	0.58292	0.83042	0.4466	7124
SexBi	1	1.4229E-4	1.4229E-4	2.2518E-4	0.8263	756
CoxBi	1	1.0363	1.0363	0.64641	0.4994	799
YexRe(Bi)	2	5.5286	2.7643	4.6	0.0175	9955
SexRe(Bi)	2	1.2638	0.6319	1.0515	0.3596	9944
CoxRe(Bi)	2	3.2062	1.6031	2.6677	0.0895	9951
YexSexCo	1	1.6024	1.6024	7.3828	0.1098	9443
YexSexBi	1	0.38914	0.38914	0.9276	0.43	7117
YexCoxBi	1	0.68252	0.68252	6.3224	0.1302	7136
SexCoxBi	1	0.61801	0.61801	0.88041	0.446	7133
YexSexRe(Bi)	2	0.83903	0.41951	0.69809	0.5105	9952
YexCoxRe(Bi)	2	0.21591	0.10795	0.17964	0.8349	9944
SexCoxRe(Bi)	2	1.4039	0.70196	1.1681	0.3267	9945
YexSexCoxBi	1	1.1711	1.1711	5.3957	0.1463	9385
YexSexCoxRe(Bi)	2	0.4341	0.21705	0.36118	0.7028	9961
Res	32	19.23	0.60094			
Total	63	117.69				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.26086	0.51074
S(Se)	7.5249E-2	0.27432
S(Co)	0.12681	0.3561
S(Bi)	1.2541	1.1199
V(Re(Bi))	0.23279	0.48249
S(YexSe)	-2.0183E-2	-0.14207
S(YexCo)	-3.7364E-3	-6.1126E-2
S(YexBi)	0.22878	0.47831
S(SexCo)	-7.44E-3	-8.6256E-2
S(SexBi)	-3.9485E-2	-0.19871
S(CoxBi)	-3.5427E-2	-0.18822
V(YexRe(Bi))	0.27042	0.52002
V(SexRe(Bi))	3.8704E-3	6.2213E-2
V(CoxRe(Bi))	0.12527	0.35394
S(YexSexCo)	0.17317	0.41614
S(YexSexBi)	-3.7967E-3	-6.1617E-2
S(YexCoxBi)	7.1821E-2	0.26799
S(SexCoxBi)	-1.0494E-2	-0.10244
V(YexSexRe(Bi))	-4.5357E-2	-0.21297
V(YexCoxRe(Bi))	-0.12325	-0.35106
V(SexCoxRe(Bi))	2.5255E-2	0.15892
S(YexSexCoxBi)	0.23852	0.48839
V(YexSexCoxRe(Bi))	-0.19194	-0.43811
V(Res)	0.60094	0.7752

PERMANOVA – Region A, 4th root transformed deposit feeder biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1.8901	1.8901	3.2195	0.1159	9739
Se	1	0.13831	0.13831	0.2356	0.6428	9803
Co	1	8.3964	8.3964	14.302	0.0046	9761
YexSe	1	1.1496E-2	1.1496E-2	1.9582E-2	0.893	9825
YexCo	1	5.1692E-7	5.1692E-7	8.8052E-7	1	9697
SexCo	1	0.20087	0.20087	0.34215	0.5742	9777
YexSexCo	1	0.85861	0.85861	1.4625	0.2699	9819
Res	8	4.6965	0.58707			
Total	15	16.192				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.16288	0.40358
S(Se)	-5.6094E-2	-0.23684
S(Co)	0.97617	0.98801
S(YexSe)	-0.14389	-0.37933
S(YexCo)	-0.14677	-0.3831
S(SexCo)	-9.655E-2	-0.31072
S(YexSexCo)	0.13577	0.36847
V(Res)	0.58707	0.7662

PERMANOVA – Region B, 4th root transformed deposit feeder biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	20.19	20.19	16.175	0.0073	9786
Se	1	1.8488	1.8488	1.4811	0.2541	9812
Co	1	0.2496	0.2496	0.19997	0.6619	9824
YexSe	1	0.68453	0.68453	0.54841	0.4866	9822
YexCo	1	0.36892	0.36892	0.29556	0.6005	9818
SexCo	1	0.22168	0.22168	0.1776	0.6779	9813
YexSexCo	1	2.0205	2.0205	1.6187	0.2396	9733
Res	8	9.9857	1.2482			
Total	15	35.57				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	2.3677	1.5387
S(Se)	7.5069E-2	0.27399
S(Co)	-0.12483	-0.35331
S(YexSe)	-0.14092	-0.3754
S(YexCo)	-0.21982	-0.46885
S(SexCo)	-0.25663	-0.50659
S(YexSexCo)	0.38616	0.62142
V(Res)	1.2482	1.1172

PERMANOVA – Region C, 4th root transformed deposit feeder biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.95339	0.95339	3.5574	0.0971	9770
Se	1	6.495E-2	6.495E-2	0.24235	0.6265	9791
Co	1	1.1824	1.1824	4.412	0.0691	9797
YexSe	1	0.4829	0.4829	1.8018	0.221	9684
YexCo	1	0.41904	0.41904	1.5636	0.2439	9780
SexCo	1	5.5102E-3	5.5102E-3	2.056E-2	0.8793	9761
YexSexCo	1	9.1758E-2	9.1758E-2	0.34238	0.5685	9683
Res	8	2.144	0.268			
Total	15	5.344				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	8.5674E-2	0.2927
S(Se)	-2.5381E-2	-0.15932
S(Co)	0.1143	0.33809
S(YexSe)	5.3724E-2	0.23178
S(YexCo)	3.776E-2	0.19432
S(SexCo)	-6.5623E-2	-0.25617
S(YexSexCo)	-8.8122E-2	-0.29685
V(Res)	0.268	0.51769

PERMANOVA – Region D, 4th root transformed deposit feeder biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	3.1571E-2	3.1571E-2	0.10507	0.7535	9805
Se	1	2.2518	2.2518	7.494	0.028	9812
Co	1	7.5037E-2	7.5037E-2	0.24972	0.6249	9815
YexSe	1	0.14582	0.14582	0.4853	0.4991	9835
YexCo	1	0.15864	0.15864	0.52795	0.4827	9815
SexCo	1	2.1768	2.1768	7.2444	0.0241	9769
YexSexCo	1	0.23678	0.23678	0.78799	0.3972	9814
Res	8	2.4038	0.30048			
Total	15	7.4803				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-3.3614E-2	-0.18334
S(Se)	0.24392	0.49388
S(Co)	-2.818E-2	-0.16787
S(YexSe)	-3.8664E-2	-0.19663
S(YexCo)	-3.546E-2	-0.18831
S(SexCo)	0.46908	0.68489
S(YexSexCo)	-3.1852E-2	-0.17847
V(Res)	0.30048	0.54816

PERMANOVA (Pairwise) – Region D, 4th root transformed deposit feeder biomass data (Euclidean distance).

Term 'SexCo' for pairs of levels of factor 'Season'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	3.0717	0.0522	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Distance between/within groups

	W	S
W	0.67642	
S	1.488	0.7723

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	4.9116E-2	0.942	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Distance between/within groups

	W	S
W	0.27633	
S	0.31079	0.44417

Term 'SexCo' for pairs of levels of factor 'Condition'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	2.4105	0.1538	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	0.67642	
U	0.87466	0.27633

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	1.4621	0.2367	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	0.7723	
U	0.63946	0.44417

PERMDISP – Region A, 4th root transformed deposit feeder biomass data (Euclidean distance).

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 4.0867E-2 df1: 1 df2: 14
P(perm): 0.8603

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.20216	0.8543

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	0.54755	0.20583
U	8	0.49762	0.13654

PERMDISP – Region B, 4th root transformed deposit feeder biomass data (Euclidean distance).

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 1.5158 df1: 1 df2: 14
P(perm): 0.2917

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	1.2312	0.2813

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	0.66934	0.13209
2	8	0.99393	0.22817

PERMDISP – Region D, 4th root transformed deposit feeder biomass data (Euclidean distance).

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.34396 df1: 1 df2: 14
P(perm): 0.5424

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.58648	0.5469

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.48225	0.11554
S	8	0.36304	0.16723

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 5.8828 df1: 1 df2: 14
P(perm): 0.0177

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	2.4255	1.5E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	0.744	0.20789
U	8	0.22375	5.2804E-2

<u>ANOSIM – Region B, 4th root transformed deposit feeder biomass data (Euclidean distance).</u>

Year
Global Test
Sample statistic (Global R): 0.472
Significance level of sample statistic: 0.4%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 3

PERMANOVA – All sites, 4th root transformed scavenger biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.86116	0.86116	0.1928	0.7059	800
Se	1	0.23841	0.23841	9.6791E-2	0.6681	797
Co	1	3.7503	3.7503	0.29209	0.6186	800
Bi	1	80.962	80.962	10.989	0.3265	3
Re(Bi)	2	14.735	7.3675	6.0514	0.005	9949
YexSe	1	1.2511	1.2511	1.5097	0.3431	7132
YexCo	1	1.8075E-2	1.8075E-2	7.8385E-3	0.7857	6616
YexBi	1	9.1391E-2	9.1391E-2	2.0461E-2	0.7998	800
SexCo	1	0.42667	0.42667	1.5012	0.3558	6567
SexBi	1	1.1967	1.1967	0.48583	0.5508	797
CoxBi	1	1.207	1.207	9.4007E-2	0.7577	799
YexRe(Bi)	2	8.9334	4.4667	3.6687	0.0373	9940
SexRe(Bi)	2	4.9264	2.4632	2.0232	0.1473	9943
CoxRe(Bi)	2	25.678	12.839	10.546	0.0004	9964
YexSexCo	1	0.21768	0.21768	0.74356	0.4834	9347
YexSexBi	1	1.2621	1.2621	1.5231	0.342	7104
YexCoxBi	1	1.6378	1.6378	0.71023	0.4875	7111
SexCoxBi	1	5.1079E-2	5.1079E-2	0.17971	0.6995	6620
YexSexRe(Bi)	2	1.6573	0.82867	0.68063	0.5168	9948
YexCoxRe(Bi)	2	4.6119	2.306	1.894	0.1695	9953
SexCoxRe(Bi)	2	0.56846	0.28423	0.23345	0.7917	9941
YexSexCoxBi	1	2.1934	2.1934	7.4921	0.1164	9420
YexSexCoxRe(Bi)	2	0.58552	0.29276	0.24046	0.7836	9942
Res	32	38.96	1.2175			
Total	63	196.02				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-0.11267	-0.33567
S(Se)	-6.9524E-2	-0.26367
S(Co)	-0.28403	-0.53294
S(Bi)	2.2998	1.5165
V(Re(Bi))	0.38438	0.61998
S(YexSe)	2.64E-2	0.16248
S(YexCo)	-0.14299	-0.37814
S(YexBi)	-0.27346	-0.52293
S(SexCo)	8.9026E-3	9.4354E-2
S(SexBi)	-7.9156E-2	-0.28135
S(CoxBi)	-0.72702	-0.85265
V(YexRe(Bi))	0.40615	0.6373
V(SexRe(Bi))	0.15571	0.3946
V(CoxRe(Bi))	1.4527	1.2053
S(YexSexCo)	-9.3843E-3	-9.6872E-2
S(YexSexBi)	5.4183E-2	0.23277
S(YexCoxBi)	-8.3525E-2	-0.28901
S(SexCoxBi)	-2.9144E-2	-0.17072
V(YexSexRe(Bi))	-9.7207E-2	-0.31178
V(YexCoxRe(Bi))	0.27212	0.52165
V(SexCoxRe(Bi))	-0.23332	-0.48303
S(YexSexCoxBi)	0.47515	0.68931
V(YexSexCoxRe(Bi))	-0.46237	-0.67998
V(Res)	1.2175	1.1034

PERMANOVA – Region A, 4th root transformed scavenger biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	2.2024	2.2024	1.6294	0.2389	9809
Se	1	0.23508	0.23508	0.17391	0.6734	9743
Co	1	25.645	25.645	18.972	0.0043	9803
YexSe	1	0.58866	0.58866	0.4355	0.5451	9842
YexCo	1	0.32576	0.32576	0.241	0.6258	9754
SexCo	1	8.7475E-3	8.7475E-3	6.4716E-3	0.9119	9695
YexSexCo	1	0.27436	0.27436	0.20297	0.6662	9775
Res	8	10.814	1.3517			
Total	15	40.093				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.10634	0.3261
S(Se)	-0.13958	-0.3736
S(Co)	3.0366	1.7426
S(YexSe)	-0.19076	-0.43676
S(YexCo)	-0.25648	-0.50644
S(SexCo)	-0.33574	-0.57943
S(YexSexCo)	-0.53867	-0.73394
V(Res)	1.3517	1.1626

PERMANOVA – Region B, 4th root transformed scavenger biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	7.3677	7.3677	3.963	0.0818	9812
Se	1	4.2727	4.2727	2.2983	0.1637	9827
Co	1	4.1163	4.1163	2.2142	0.1783	9805
YexSe	1	0.58111	0.58111	0.31257	0.5874	9826
YexCo	1	2.9449	2.9449	1.584	0.2476	9804
SexCo	1	0.94621	0.94621	0.50896	0.5011	9791
YexSexCo	1	0.24073	0.24073	0.12949	0.7242	9815
Res	8	14.873	1.8591			
Total	15	35.343				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.68857	0.8298
S(Se)	0.3017	0.54927
S(Co)	0.28215	0.53118
S(YexSe)	-0.3195	-0.56524
S(YexCo)	0.27144	0.521
S(SexCo)	-0.22822	-0.47773
S(YexSexCo)	-0.80919	-0.89955
V(Res)	1.8591	1.3635

PERMANOVA – Region C, 4th root transformed scavenger biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	4.5997E-3	4.5997E-3	5.1133E-3	0.9427	9816
Se	1	1.4803	1.4803	1.6456	0.2331	9816
Co	1	8.5931E-3	8.5931E-3	9.5526E-3	0.9238	9832
YexSe	1	2.6073	2.6073	2.8985	0.1239	9809
YexCo	1	2.9118	2.9118	3.2369	0.1067	9789
SexCo	1	4.5691E-2	4.5691E-2	5.0793E-2	0.8216	9830
YexSexCo	1	0.18746	0.18746	0.20839	0.6435	9779
Res	8	7.1964	0.89955			
Total	15	14.442				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-0.11187	-0.33447
S(Se)	7.2597E-2	0.26944
S(Co)	-0.11137	-0.33372
S(YexSe)	0.42695	0.65341
S(YexCo)	0.50305	0.70926
S(SexCo)	-0.21347	-0.46202
S(YexSexCo)	-0.35605	-0.5967
V(Res)	0.89955	0.94845

PERMANOVA – Region D, 4th root transformed scavenger biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.3112	0.3112	0.40967	0.5437	9821
Se	1	0.37336	0.37336	0.4915	0.5084	9840
Co	1	0.86608	0.86608	1.1401	0.3083	9829
YexSe	1	0.39341	0.39341	0.5179	0.4901	9823
YexCo	1	8.5377E-2	8.5377E-2	0.11239	0.7418	9820
SexCo	1	4.5557E-2	4.5557E-2	5.9971E-2	0.8097	9800
YexSexCo	1	2.294	2.294	3.0199	0.1229	9816
Res	8	6.0771	0.75964			
Total	15	10.446				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-5.6054E-2	-0.23676
S(Se)	-4.8285E-2	-0.21974
S(Co)	1.3305E-2	0.11535
S(YexSe)	-9.1556E-2	-0.30258
S(YexCo)	-0.16857	-0.41057
S(SexCo)	-0.17852	-0.42252
S(YexSexCo)	0.76719	0.87589
V(Res)	0.75964	0.87157

PERMDISP – Region A, 4th root transformed scavenger biomass data (Euclidean distance).

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 8.8208 df1: 1 df2: 14
P(perm): 0.0074

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	2.97	7.9E-3

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	1.0931	0.26676
U	8	0.26929	7.6064E-2

ANOSIM – Region A, 4th root transformed scavenger biomass data (Euclidean distance).

Condition

Global Test

Sample statistic (Global R): 0.7
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 0

PERMANOVA – All sites, 4th root transformed filter feeder biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	2.1544	2.1544	0.1554	0.6288	798
Se	1	4.1002	4.1002	1.1125	0.4002	800
Co	1	45.209	45.209	4.2912	0.1708	799
Bi	1	0.11292	0.11292	4.0042E-4	0.6658	3
Re(Bi)	2	564	282	150.61	0.0001	9952
YexSe	1	0.42008	0.42008	3.5992	0.2036	7125
YexCo	1	11.337	11.337	1.0288	0.4188	7180
YexBi	1	20.775	20.775	1.4985	0.3469	798
SexCo	1	1.0029	1.0029	0.75262	0.4737	7108
SexBi	1	11.847	11.847	3.2143	0.1969	799
CoxBi	1	4.6199	4.6199	0.43852	0.557	800
YexRe(Bi)	2	27.728	13.864	7.4046	0.0022	9942
SexRe(Bi)	2	7.3715	3.6858	1.9685	0.1555	9943
CoxRe(Bi)	2	21.07	10.535	5.6267	0.0088	9954
YexSexCo	1	3.1038	3.1038	1.051	0.417	9459
YexSexBi	1	0.47001	0.47001	4.0269	0.182	7101
YexCoxBi	1	4.3036	4.3036	0.39054	0.5913	7188
SexCoxBi	1	0.12893	0.12893	9.6757E-2	0.7729	7169
YexSexRe(Bi)	2	0.23343	0.11672	6.2337E-2	0.9349	9948
YexCoxRe(Bi)	2	22.04	11.02	5.8855	0.0062	9938
SexCoxRe(Bi)	2	2.665	1.3325	0.71167	0.5023	9953
YexSexCoxBi	1	0.34838	0.34838	0.11797	0.7672	9413
YexSexCoxRe(Bi)	2	5.9062	2.9531	1.5772	0.2292	9957
Res	32	59.915	1.8723			
Total	63	820.86				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-0.36593	-0.60492
S(Se)	1.2952E-2	0.11381
S(Co)	1.0836	1.0409
S(Bi)	-8.809	-2.968
V(Re(Bi))	17.508	4.1843
S(YexSe)	1.896E-2	0.1377
S(YexCo)	1.9826E-2	0.14081
S(YexBi)	0.43195	0.65723
S(SexCo)	-2.0602E-2	-0.14353
S(SexBi)	0.5101	0.71421
S(CoxBi)	-0.36971	-0.60803
V(YexRe(Bi))	1.499	1.2243
V(SexRe(Bi))	0.22668	0.47611
V(CoxRe(Bi))	1.0828	1.0406
S(YexSexCo)	1.883E-2	0.13722
S(YexSexBi)	4.4162E-2	0.21015
S(YexCoxBi)	-0.83951	-0.91625
S(SexCoxBi)	-0.15045	-0.38787
V(YexSexRe(Bi))	-0.43891	-0.6625
V(YexCoxRe(Bi))	2.2869	1.5122
V(SexCoxRe(Bi))	-0.13496	-0.36737
S(YexSexCoxBi)	-0.65118	-0.80696
V(YexSexCoxRe(Bi))	0.54038	0.73511
V(Res)	1.8723	1.3683

PERMANOVA – Region A, 4th root transformed filter feeder biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	5.2956E-2	5.2956E-2	5.0901E-2	0.8213	9838
Se	1	2.2341	2.2341	2.1474	0.1806	9830
Co	1	3.0857	3.0857	2.9659	0.1238	9834
YexSe	1	6.6717E-3	6.6717E-3	6.4128E-3	0.9319	9822
YexCo	1	0.34062	0.34062	0.3274	0.5711	9806
SexCo	1	0.58665	0.58665	0.56388	0.4699	9836
YexSexCo	1	7.5309E-2	7.5309E-2	7.2387E-2	0.8088	9815
Res	8	8.323	1.0404			
Total	15	14.705				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-0.12343	-0.35132
S(Se)	0.14921	0.38628
S(Co)	0.25566	0.50563
S(YexSe)	-0.25843	-0.50836
S(YexCo)	-0.17494	-0.41826
S(SexCo)	-0.11343	-0.3368
S(YexSexCo)	-0.48253	-0.69465
V(Res)	1.0404	1.02

PERMANOVA – Region B, 4th root transformed filter feeder biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	33.59	33.59	11.329	0.0132	9819
Se	1	15.778	15.778	5.3216	0.0499	9841
Co	1	50.645	50.645	17.081	0.0048	9844
YexSe	1	1.9579E-3	1.9579E-3	6.6034E-4	0.9827	9843
YexCo	1	36.303	36.303	12.244	0.0085	9816
SexCo	1	1.9833	1.9833	0.66891	0.4463	9832
YexSexCo	1	0.80476	0.80476	0.27142	0.6232	9842
Res	8	23.72	2.965			
Total	15	162.83				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	3.8281	1.9566
S(Se)	1.6017	1.2656
S(Co)	5.96	2.4413
S(YexSe)	-0.74075	-0.86067
S(YexCo)	8.3345	2.887
S(SexCo)	-0.24541	-0.49539
S(YexSexCo)	-1.0801	-1.0393
V(Res)	2.965	1.7219

PERMANOVA (pairwise) – Region B, 4th root transformed filter feeder biomass data (Euclidean distance).

Term 'YexCo' for pairs of levels of factor 'Year'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	7.6008	0.0278	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Distance between/within groups

	1	2
1	1.4115	
2	5.9104	1.6064

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	7.4698E-2	0.9405	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Distance between/within groups

	1	2
1	1.9566	
2	2.2256	3.3869

Term 'YexCo' for pairs of levels of factor 'Condition'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
N-U, U	8.9605	0.0306	268

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	1.4115	
U	6.5709	1.9566

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
N-U, U	0.35025	0.7468	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	1.6064	
U	2.4024	3.3869

PERMANOVA – Region C, 4th root transformed filter feeder biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	16.152	16.152	5.0316	0.0541	9841
Se	1	4.7317	4.7317	1.474	0.2543	9837
Co	1	16.96	16.96	5.2832	0.0537	9754
YexSe	1	1.0053	1.0053	0.31316	0.5796	9800
YexCo	1	0.10827	0.10827	3.3726E-2	0.8581	9826
SexCo	1	1.1415	1.1415	0.3556	0.5623	9817
YexSexCo	1	8.2141	8.2141	2.5587	0.1478	9791
Res	8	25.682	3.2102			
Total	15	73.995				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	1.6178	1.2719
S(Se)	0.19019	0.43611
S(Co)	1.7188	1.311
S(YexSe)	-0.55123	-0.74245
S(YexCo)	-0.77548	-0.88061
S(SexCo)	-0.51716	-0.71914
S(YexSexCo)	2.5019	1.5818
V(Res)	3.2102	1.7917

PERMANOVA – Region D, 4th root transformed filter feeder biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.86269	0.86269	3.15	0.1155	9814
Se	1	0.57482	0.57482	2.0989	0.1891	9817
Co	1	0.20801	0.20801	0.75951	0.4092	9830
YexSe	1	0.10961	0.10961	0.40021	0.5454	9830
YexCo	1	0.92829	0.92829	3.3895	0.1041	9806
SexCo	1	8.5307E-2	8.5307E-2	0.31148	0.5863	9814
YexSexCo	1	0.26423	0.26423	0.96479	0.3573	9820
Res	8	2.191	0.27387			
Total	15	5.2239				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	7.3602E-2	0.2713
S(Se)	3.7619E-2	0.19396
S(Co)	-8.233E-3	-9.0736E-2
S(YexSe)	-4.1066E-2	-0.20265
S(YexCo)	0.1636	0.40448
S(SexCo)	-4.7141E-2	-0.21712
S(YexSexCo)	-4.8213E-3	-6.9435E-2
V(Res)	0.27387	0.52333

PERMDISP – Region B, 4th root transformed filter feeder biomass data (Euclidean distance).

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 7.0973 df1: 1 df2: 14
P(perm): 0.0207

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	2.6641	2.21E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	3.2854	0.47243
2	8	1.6132	0.41331

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 1.9475E-2 df1: 1 df2: 14
P(perm): 0.894

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.13955	0.8925

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	2.6741	0.58116
S	8	2.56	0.57472

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 4.6351 df1: 1 df2: 14
P(perm): 0.0643

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	2.1529	6.84E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	2.9552	0.39114
U	8	1.6597	0.4573

ANOSIM – Region B, 4th root transformed filter feeder biomass data (Euclidean distance).

Condition (across Y1)
Global Test
Sample statistic (Global R): 0.969
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Year (across Non-upwelling)
Global Test
Sample statistic (Global R): 1
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

PERMANOVA – All sites, 4th root transformed, both developmental modes, biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	120.04	120.04	0.25148	0.6748	800
Se	1	341.14	341.14	1.1243	0.4168	799
Co	1	392.84	392.84	0.3667	0.6695	799
Bi	1	3169.7	3169.7	0.8616	0.6661	3
Re(Bi)	2	7357.6	3678.8	41.009	0.0001	9962
YexSe	1	87.799	87.799	2.1171	0.2474	7221
YexCo	1	259.73	259.73	0.77406	0.5039	7156
YexBi	1	556.63	556.63	1.1661	0.3759	801
SexCo	1	162.39	162.39	1.4739	0.3355	7155
SexBi	1	456.77	456.77	1.5054	0.3002	799
CoxBi	1	-47.047	-47.047	Negative		
YexRe(Bi)	2	954.69	477.35	5.3211	0.0035	9967
SexRe(Bi)	2	606.84	303.42	3.3823	0.0262	9972
CoxRe(Bi)	2	2142.6	1071.3	11.942	0.0002	9961
YexSexCo	1	171.52	171.52	4.6281	0.1063	9489
YexSexBi	1	32.045	32.045	0.77271	0.3998	7181
YexCoxBi	1	535.37	535.37	1.5955	0.3143	7179
SexCoxBi	1	63.038	63.038	0.57217	0.617	7182
YexSexRe(Bi)	2	82.942	41.471	0.46229	0.7	9961
YexCoxRe(Bi)	2	671.09	335.54	3.7404	0.0193	9960
SexCoxRe(Bi)	2	220.35	110.17	1.2281	0.3421	9967
YexSexCoxBi	1	81.005	81.005	2.1857	0.2137	9526
YexSexCoxRe(Bi)	2	74.122	37.061	0.41313	0.7069	9972
Res	32	2870.6	89.707			
Total	63	21364				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-11.166	-3.3415
S(Se)	1.1787	1.0857
S(Co)	-21.202	-4.6045
S(Bi)	-15.911	-3.9889
V(Re(Bi))	224.32	14.977
S(YexSe)	2.8955	1.7016
S(YexCo)	-4.7382	-2.1767
S(YexBi)	4.9554	2.2261
S(SexCo)	3.2635	1.8065
S(SexBi)	9.5842	3.0958
S(CoxBi)	-69.896	-8.3604
V(YexRe(Bi))	48.455	6.961
V(SexRe(Bi))	26.714	5.1686
V(CoxRe(Bi))	122.7	11.077
S(YexSexCo)	16.808	4.0997
S(YexSexBi)	-1.1782	-1.0855
S(YexCoxBi)	24.978	4.9978
S(SexCoxBi)	-5.8919	-2.4273
V(YexSexRe(Bi))	-12.059	-3.4726
V(YexCoxRe(Bi))	61.459	7.8396
V(SexCoxRe(Bi))	5.1164	2.2619
S(YexSexCoxBi)	10.986	3.3145
V(YexSexCoxRe(Bi))	-26.323	-5.1306
V(Res)	89.707	9.4714

PERMANOVA – Region A, 4th root transformed, both developmental modes, biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	41.932	41.932	0.94059	0.43	9945
Se	1	552.14	552.14	12.385	0.0016	9938
Co	1	967.17	967.17	21.695	0.0011	9920
YexSe	1	3.7435	3.7435	8.3971E-2	0.8572	9929
YexCo	1	58.324	58.324	1.3083	0.3245	9950
SexCo	1	188.65	188.65	4.2316	0.045	9935
YexSexCo	1	4.3577	4.3577	9.7748E-2	0.849	9928
Res	8	356.65	44.581			
Total	15	2173				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-0.33109	-0.5754
S(Se)	63.444	7.9652
S(Co)	115.32	10.739
S(YexSe)	-10.209	-3.1952
S(YexCo)	3.4358	1.8536
S(SexCo)	36.017	6.0014
S(YexSexCo)	-20.112	-4.4846
V(Res)	44.581	6.6769

PERMANOVA (Pairwise) – Region A, 4th root transformed, both developmental modes, biomass data.

Term 'SexCo' for pairs of levels of factor 'Season'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	1.7043	0.1225	270

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	90.912	
S	88.157	90.441

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
W, S	4.6085	0.027	269

Denominators

Groups	Denominator	Den.df
W, S	1*Res	4

Average Similarity between/within groups

	W	S
W	92.146	
S	83.034	96.087

Term 'SexCo' for pairs of levels of factor 'Condition'

Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	3.7976	0.0278	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	90.912	
U	78.922	92.146

Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms
N-U, U	3.1992	0.0289	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	90.441	
U	86.742	96.087

PERMANOVA – Region B, 4th root transformed, both developmental modes, biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1213.2	1213.2	13.967	0.0034	9929
Se	1	375.84	375.84	4.3268	0.0449	9939
Co	1	995.35	995.35	11.459	0.0054	9928
YexSe	1	43.23	43.23	0.49768	0.6408	9926
YexCo	1	1114	1114	12.825	0.0047	9930
SexCo	1	172.01	172.01	1.9802	0.1738	9931
YexSexCo	1	34.004	34.004	0.39146	0.6674	9934
Res	8	694.91	86.864			
Total	15	4642.6				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	140.79	11.866
S(Se)	36.122	6.0102
S(Co)	113.56	10.657
S(YexSe)	-10.908	-3.3028
S(YexCo)	256.79	16.025
S(SexCo)	21.286	4.6137
S(YexSexCo)	-26.43	-5.141
V(Res)	86.864	9.3201

PERMANOVA (Pairwise) – Region B, 4th root transformed, both developmental modes, biomass data.

Term 'YexCo' for pairs of levels of factor 'Condition'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
N-U, U	6.032	0.0309	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	90.335	
U	66.945	87.453

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
N-U, U	0.28897	0.8579	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Similarity between/within groups

	N-U	U
N-U	88.201	
U	87.135	81.987

Term 'YexCo' for pairs of levels of factor 'Year'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	6.2991	0.0298	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	90.335	
2	64.83	88.201

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	Negative		

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Similarity between/within groups

	1	2
1	87.453	
2	87.313	81.987

PERMANOVA – Region C, 4th root transformed, both developmental modes, biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	316.87	316.87	2.868	0.1025	9940
Se	1	176.45	176.45	1.597	0.2524	9932
Co	1	344.12	344.12	3.1145	0.0862	9920
YexSe	1	128.01	128.01	1.1586	0.35	9940
YexCo	1	273.05	273.05	2.4714	0.1287	9934
SexCo	1	82.092	82.092	0.74301	0.4947	9936
YexSexCo	1	93.565	93.565	0.84685	0.4336	9948
Res	8	883.89	110.49			
Total	15	2298.1				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	25.798	5.0792
S(Se)	8.2457	2.8715
S(Co)	29.204	5.404
S(YexSe)	4.3801	2.0929
S(YexCo)	40.642	6.3751
S(SexCo)	-7.0986	-2.6643
S(YexSexCo)	-8.4607	-2.9087
V(Res)	110.49	10.511

PERMANOVA – Region D, 4th root transformed, both developmental modes, biomass data.

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	59.366	59.366	0.50784	0.5341	9922
Se	1	300.32	300.32	2.5691	0.1081	9940
Co	1	181.74	181.74	1.5547	0.2388	9924
YexSe	1	27.806	27.806	0.23787	0.7	9934
YexCo	1	20.769	20.769	0.17767	0.7464	9929
SexCo	1	3.0248	3.0248	2.5875E-2	0.8701	9939
YexSexCo	1	194.72	194.72	1.6657	0.2237	9916
Res	8	935.19	116.9			
Total	15	1722.9				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-7.1916	-2.6817
S(Se)	22.928	4.7883
S(Co)	8.1054	2.847
S(YexSe)	-22.273	-4.7194
S(YexCo)	-24.032	-4.9023
S(SexCo)	-28.468	-5.3356
S(YexSexCo)	38.912	6.238
V(Res)	116.9	10.812

PERMDISP – Region A, 4th root transformed, both developmental modes, biomass data.

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 3.0043 df1: 1 df2: 14
P(perm): 0.1327

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	1.7333	0.1367

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	10.878	1.6002
S	8	6.9461	1.608

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.57979 df1: 1 df2: 14
P(perm): 0.4507

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.76144	0.4536

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	7.2742	1.2876
U	8	8.6526	1.2725

PERMDISP – Region B, 4th root transformed, both developmental modes, biomass data.

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 12.736 df1: 1 df2: 14
P(perm): 0.0045

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	3.5688	3.5E-3

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	18.118	1.7085
U	8	9.1142	1.8565

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 7.4708 df1: 1 df2: 14
P(perm): 0.0186

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	2.7333	2.07E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	16.963	2.0716
2	8	9.1567	1.9658

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.19317 df1: 1 df2: 14
P(perm): 0.7079

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.43951	0.7138

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	15.57	2.385
S	8	13.937	2.8498

ANOSIM – Region A, 4th root transformed, both developmental modes, biomass data.

Season (across Upwelling)
Global Test
Sample statistic (Global R): 0.958
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Condition (across Summer)
Global Test
Sample statistic (Global R): 0.625
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Condition (across Winter)
Global Test
Sample statistic (Global R): 0.948
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

ANOSIM – Region B, 4th root transformed, both developmental modes, biomass data.

Condition (across Y1)
Global Test
Sample statistic (Global R): 0.979
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Year (across Non-upwelling)
Global Test
Sample statistic (Global R): 1
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

PERMANOVA – All sites, 4th root transformed, direct developer biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1.7113	1.7113	0.20722	0.6909	799
Se	1	7.9434	7.9434	18.486	0.0718	798
Co	1	2.9093	2.9093	0.12338	0.7517	798
Bi	1	49.276	49.276	11.119	0.3346	3
Re(Bi)	2	8.8635	4.4318	2.2702	0.1244	9959
YexSe	1	1.1013	1.1013	0.63715	0.5002	7102
YexCo	1	0.44477	0.44477	7.7171E-2	0.7948	7120
YexBi	1	0.27321	0.27321	3.3084E-2	0.8246	801
SexCo	1	1.6776	1.6776	37.451	0.0456	7088
SexBi	1	11.601	11.601	26.999	0.0723	800
CoxBi	1	2.4124	2.4124	0.10231	0.766	798
YexRe(Bi)	2	16.516	8.2582	4.2302	0.0224	9940
SexRe(Bi)	2	0.85938	0.42969	0.22011	0.7988	9947
CoxRe(Bi)	2	47.16	23.58	12.079	0.0002	9945
YexSexCo	1	1.1251	1.1251	4.9848	0.1568	9448
YexSexBi	1	0.2455	0.2455	0.14203	0.7122	7138
YexCoxBi	1	5.0042	5.0042	0.86827	0.4473	7173
SexCoxBi	1	0.67151	0.67151	14.991	0.0601	7116
YexSexRe(Bi)	2	3.457	1.7285	0.88543	0.4159	9956
YexCoxRe(Bi)	2	11.527	5.7634	2.9523	0.0667	9951
SexCoxRe(Bi)	2	8.9588E-2	4.4794E-2	2.2945E-2	0.9782	9944
YexSexCoxBi	1	2.034	2.034	9.0117	0.0937	9362
YexSexCoxRe(Bi)	2	0.45142	0.22571	0.11562	0.8935	9948
Res	32	62.47	1.9522			
Total	63	239.83				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-0.20459	-0.45232
S(Se)	0.2348	0.48456
S(Co)	-0.64596	-0.80372
S(Bi)	1.4014	1.1838
V(Re(Bi))	0.15497	0.39367
S(YexSe)	-3.92E-2	-0.19799
S(YexCo)	-0.33241	-0.57655
S(YexBi)	-0.49906	-0.70644
S(SexCo)	0.10205	0.31945
S(SexBi)	0.69823	0.8356
S(CoxBi)	-1.323	-1.1502
V(YexRe(Bi))	0.78825	0.88784
V(SexRe(Bi))	-0.19031	-0.43625
V(CoxRe(Bi))	2.7035	1.6442
S(YexSexCo)	0.11243	0.3353
S(YexSexBi)	-0.18538	-0.43056
S(YexCoxBi)	-9.4903E-2	-0.30806
S(SexCoxBi)	7.834E-2	0.27989
V(YexSexRe(Bi))	-5.5916E-2	-0.23646
V(YexCoxRe(Bi))	0.9528	0.97611
V(SexCoxRe(Bi))	-0.47685	-0.69054
S(YexSexCoxBi)	0.45208	0.67237
V(YexSexCoxRe(Bi))	-0.86324	-0.92911
V(Res)	1.9522	1.3972

PERMANOVA – Region A, 4th root transformed, direct developer biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	3.4017	3.4017	2.1497	0.1814	9785
Se	1	8.3649	8.3649	5.2864	0.0475	9803
Co	1	40.318	40.318	25.48	0.0031	9764
YexSe	1	0.51395	0.51395	0.3248	0.5961	9826
YexCo	1	1.7142	1.7142	1.0833	0.3291	9819
SexCo	1	1.3053	1.3053	0.82489	0.3942	9831
YexSexCo	1	9.3568E-3	9.3568E-3	5.9132E-3	0.917	9745
Res	8	12.659	1.5824			
Total	15	68.287				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	0.22741	0.47688
S(Se)	0.84782	0.92077
S(Co)	4.842	2.2005
S(YexSe)	-0.2671	-0.51682
S(YexCo)	3.297E-2	0.18158
S(SexCo)	-6.9273E-2	-0.2632
S(YexSexCo)	-0.7865	-0.88685
V(Res)	1.5824	1.2579

PERMANOVA – Region B, 4th root transformed, direct developer biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	13.507	13.507	4.3509	0.0719	9790
Se	1	11.104	11.104	3.5767	0.0962	9823
Co	1	9.5533	9.5533	3.0773	0.1194	9799
YexSe	1	1.6151	1.6151	0.52025	0.4956	9810
YexCo	1	8.2908	8.2908	2.6706	0.1446	9802
SexCo	1	0.94515	0.94515	0.30445	0.597	9798
YexSexCo	1	0.21363	0.21363	6.8815E-2	0.803	9818
Res	8	24.836	3.1045			
Total	15	70.065				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	1.3003	1.1403
S(Se)	0.99993	0.99997
S(Co)	0.80611	0.89783
S(YexSe)	-0.37235	-0.6102
S(YexCo)	1.2966	1.1387
S(SexCo)	-0.53984	-0.73473
S(YexSexCo)	-1.4454	-1.2023
V(Res)	3.1045	1.762

PERMANOVA – Region C, 4th root transformed, direct developer biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.16677	0.16677	0.14693	0.7065	9812
Se	1	0.83051	0.83051	0.73173	0.4148	9829
Co	1	1.1312	1.1312	0.99663	0.3421	9812
YexSe	1	2.667	2.667	2.3498	0.1652	9822
YexCo	1	6.8931	6.8931	6.0733	0.0408	9811
SexCo	1	0.18631	0.18631	0.16415	0.6947	9814
YexSexCo	1	0.73833	0.73833	0.65052	0.4358	9825
Res	8	9.0799	1.135			
Total	15	21.693				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-0.12103	-0.34789
S(Se)	-3.806E-2	-0.19509
S(Co)	-4.7818E-4	-2.1867E-2
S(YexSe)	0.38301	0.61888
S(YexCo)	1.4395	1.1998
S(SexCo)	-0.23717	-0.487
S(YexSexCo)	-0.19833	-0.44534
V(Res)	1.135	1.0654

PERMANOVA (Pairwise) – Region C, 4th root transformed, direct developer biomass data (Euclidean distance).

Term 'YexCo' for pairs of levels of factor 'Year'

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	1.2403	0.2843	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Distance between/within groups

	1	2
1	1.5913	
2	1.4057	1.0742

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	2.6165	0.1157	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Distance between/within groups

	1	2
1	1.4619	
2	1.6766	1.1914

Term 'YexCo' for pairs of levels of factor 'Condition'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
U, N-U	1.0162	0.3806	269

Denominators

Groups	Denominator	Den.df
U, N-U	1*Res	4

Average Distance between/within groups

	U	N-U
U	1.5913	
N-U	1.3883	1.4619

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
U, N-U	2.4999	0.0861	270

Denominators

Groups	Denominator	Den.df
U, N-U	1*Res	4

Average Distance between/within groups

	U	N-U
U	1.0742	
N-U	1.8496	1.1914

PERMANOVA – Region D, 4th root transformed, direct developer biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	1.4253	1.4253	0.71732	0.4209	9797
Se	1	0.10474	0.10474	5.2717E-2	0.8159	9761
Co	1	1.4787	1.4787	0.74425	0.4099	9829
YexSe	1	7.7778E-3	7.7778E-3	3.9145E-3	0.9485	9784
YexCo	1	7.7529E-2	7.7529E-2	3.902E-2	0.8464	9827
SexCo	1	1.9463E-3	1.9463E-3	9.7956E-4	0.9723	9828
YexSexCo	1	2.6493	2.6493	1.3334	0.2865	9794
Res	8	15.895	1.9869			
Total	15	21.64				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-7.0206E-2	-0.26496
S(Se)	-0.23527	-0.48505
S(Co)	-6.3519E-2	-0.25203
S(YexSe)	-0.49478	-0.70341
S(YexCo)	-0.47734	-0.6909
S(SexCo)	-0.49624	-0.70444
S(YexSexCo)	0.33119	0.57549
V(Res)	1.9869	1.4096

PERMDISP – Region A, 4th root transformed, direct developer biomass data (Euclidean distance).

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.99867 df1: 1 df2: 14
P(perm): 0.4194

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.99934	0.4198

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	1.873	0.32813
S	8	1.3018	0.46806

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.1235 df1: 1 df2: 14
P(perm): 0.8715

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	0.35143	0.8817

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	1.1513	0.33635
U	8	1.0087	0.22715

PERMDISP – Region C, 4th root transformed, direct developer biomass data (Euclidean distance).

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 6.3081E-2 df1: 1 df2: 14
P(perm): 0.7999

PAIRWISE COMPARISONS

Groups	t	P(perm)
(U,N-U)	0.25116	0.8019

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
U	8	0.88599	0.23081
N-U	8	0.97293	0.25795

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 3.4762E-2 df1: 1 df2: 14
P(perm): 0.8618

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	0.18645	0.8582

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	0.99783	0.1913
2	8	0.9339	0.28455

ANOSIM – Region A, 4th root transformed, direct developer biomass data (Euclidean distance).

Condition
Global Test
Sample statistic (Global R): 0.541
Significance level of sample statistic: 0.2%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 1

PERMANOVA – All sites, 4th root transformed, indirect developer biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.80914	0.80914	8.6478E-2	0.708	781
Se	1	0.33176	0.33176	2.9147E-2	0.7972	799
Co	1	9.8083	9.8083	0.61554	0.5199	798
Bi	1	38.028	38.028	0.31826	0.6612	3
Re(Bi)	2	238.98	119.49	77.658	0.0001	9957
YexSe	1	0.30855	0.30855	2.0117	0.2956	7070
YexCo	1	9.2444	9.2444	1.5321	0.3417	7126
YexBi	1	24.649	24.649	2.6344	0.2384	801
SexCo	1	3.9117	3.9117	4.8541	0.1595	7086
SexBi	1	2.3544E-3	2.3544E-3	2.0685E-4	0.8275	765
CoxBi	1	2.6851E-3	2.6851E-3	1.6851E-4	0.8279	760
YexRe(Bi)	2	18.713	9.3566	6.0811	0.0037	9964
SexRe(Bi)	2	22.764	11.382	7.3975	0.0024	9949
CoxRe(Bi)	2	31.869	15.934	10.356	0.0004	9952
YexSexCo	1	3.2254	3.2254	1.3639	0.3589	9415
YexSexBi	1	1.7829E-2	1.7829E-2	0.11624	0.749	7149
YexCoxBi	1	5.0749	5.0749	0.84108	0.4598	6760
SexCoxBi	1	0.6277	0.6277	0.77893	0.4665	7174
YexSexRe(Bi)	2	0.30676	0.15338	9.9685E-2	0.9056	9950
YexCoxRe(Bi)	2	12.068	6.0338	3.9215	0.0281	9967
SexCoxRe(Bi)	2	1.6117	0.80585	0.52374	0.6071	9955
YexSexCoxBi	1	4.1915E-2	4.1915E-2	1.7724E-2	0.8996	9457
YexSexCoxRe(Bi)	2	4.7298	2.3649	1.537	0.2349	9950
Res	32	49.236	1.5386			
Total	63	476.36				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*V(YexRe(Bi)) + 32*S(Ye)
Se	1*V(Res) + 8*V(SexRe(Bi)) + 32*S(Se)
Co	1*V(Res) + 8*V(CoxRe(Bi)) + 32*S(Co)
Bi	1*V(Res) + 16*V(Re(Bi)) + 32*S(Bi)
Re(Bi)	1*V(Res) + 16*V(Re(Bi))
YexSe	1*V(Res) + 4*V(YexSexRe(Bi)) + 16*S(YexSe)
YexCo	1*V(Res) + 4*V(YexCoxRe(Bi)) + 16*S(YexCo)
YexBi	1*V(Res) + 8*V(YexRe(Bi)) + 16*S(YexBi)
SexCo	1*V(Res) + 4*V(SexCoxRe(Bi)) + 16*S(SexCo)
SexBi	1*V(Res) + 8*V(SexRe(Bi)) + 16*S(SexBi)
CoxBi	1*V(Res) + 8*V(CoxRe(Bi)) + 16*S(CoxBi)
YexRe(Bi)	1*V(Res) + 8*V(YexRe(Bi))
SexRe(Bi)	1*V(Res) + 8*V(SexRe(Bi))
CoxRe(Bi)	1*V(Res) + 8*V(CoxRe(Bi))
YexSexCo	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 8*S(YexSexCo)
YexSexBi	1*V(Res) + 4*V(YexSexRe(Bi)) + 8*S(YexSexBi)
YexCoxBi	1*V(Res) + 4*V(YexCoxRe(Bi)) + 8*S(YexCoxBi)
SexCoxBi	1*V(Res) + 4*V(SexCoxRe(Bi)) + 8*S(SexCoxBi)
YexSexRe(Bi)	1*V(Res) + 4*V(YexSexRe(Bi))
YexCoxRe(Bi)	1*V(Res) + 4*V(YexCoxRe(Bi))
SexCoxRe(Bi)	1*V(Res) + 4*V(SexCoxRe(Bi))
YexSexCoxBi	1*V(Res) + 2*V(YexSexCoxRe(Bi)) + 4*S(YexSexCoxBi)
YexSexCoxRe(Bi)	1*V(Res) + 2*V(YexSexCoxRe(Bi))
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*YexRe(Bi)	1	2
Se	1*Se	1*SexRe(Bi)	1	2
Co	1*Co	1*CoxRe(Bi)	1	2
Bi	1*Bi	1*Re(Bi)	1	2
Re(Bi)	1*Re(Bi)	1*Res	2	32
YexSe	1*YexSe	1*YexSexRe(Bi)	1	2
YexCo	1*YexCo	1*YexCoxRe(Bi)	1	2
YexBi	1*YexBi	1*YexRe(Bi)	1	2
SexCo	1*SexCo	1*SexCoxRe(Bi)	1	2
SexBi	1*SexBi	1*SexRe(Bi)	1	2
CoxBi	1*CoxBi	1*CoxRe(Bi)	1	2
YexRe(Bi)	1*YexRe(Bi)	1*Res	2	32
SexRe(Bi)	1*SexRe(Bi)	1*Res	2	32
CoxRe(Bi)	1*CoxRe(Bi)	1*Res	2	32
YexSexCo	1*YexSexCo	1*YexSexCoxRe(Bi)	1	2
YexSexBi	1*YexSexBi	1*YexSexRe(Bi)	1	2
YexCoxBi	1*YexCoxBi	1*YexCoxRe(Bi)	1	2
SexCoxBi	1*SexCoxBi	1*SexCoxRe(Bi)	1	2
YexSexRe(Bi)	1*YexSexRe(Bi)	1*Res	2	32
YexCoxRe(Bi)	1*YexCoxRe(Bi)	1*Res	2	32
SexCoxRe(Bi)	1*SexCoxRe(Bi)	1*Res	2	32
YexSexCoxBi	1*YexSexCoxBi	1*YexSexCoxRe(Bi)	1	2
YexSexCoxRe(Bi)	1*YexSexCoxRe(Bi)	1*Res	2	32

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-0.26711	-0.51683
S(Se)	-0.34532	-0.58764
S(Co)	-0.19144	-0.43754
S(Bi)	-2.5456	-1.5955
V(Re(Bi))	7.3718	2.7151
S(YexSe)	9.6981E-3	9.8479E-2
S(YexCo)	0.20066	0.44795
S(YexBi)	0.95578	0.97764
S(SexCo)	0.19411	0.44058
S(SexBi)	-0.71124	-0.84335
S(CoxBi)	-0.99573	-0.99787
V(YexRe(Bi))	0.97725	0.98856
V(SexRe(Bi))	1.2304	1.1092
V(CoxRe(Bi))	1.7995	1.3414
S(YexSexCo)	0.10756	0.32797
S(YexSexBi)	-1.6944E-2	-0.13017
S(YexCoxBi)	-0.11986	-0.34621
S(SexCoxBi)	-2.2269E-2	-0.14923
V(YexSexRe(Bi))	-0.34631	-0.58848
V(YexCoxRe(Bi))	1.1238	1.0601
V(SexCoxRe(Bi))	-0.1832	-0.42801
S(YexSexCoxBi)	-0.58074	-0.76207
V(YexSexCoxRe(Bi))	0.41313	0.64275
V(Res)	1.5386	1.2404

PERMANOVA – Region A, 4th root transformed, indirect developer biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.12369	0.12369	0.19709	0.6735	9803
Se	1	10.319	10.319	16.442	0.0045	9806
Co	1	3.0925	3.0925	4.9275	0.056	9832
YexSe	1	3.0358E-7	3.0358E-7	4.8371E-7	1	9788
YexCo	1	3.8905E-2	3.8905E-2	6.199E-2	0.8124	9813
SexCo	1	0.26427	0.26427	0.42108	0.549	9818
YexSexCo	1	0.35605	0.35605	0.56732	0.4861	9820
Res	8	5.0209	0.62761			
Total	15	19.216				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	-6.299E-2	-0.25098
S(Se)	1.2115	1.1007
S(Co)	0.30811	0.55508
S(YexSe)	-0.1569	-0.39611
S(YexCo)	-0.14718	-0.38364
S(SexCo)	-9.0834E-2	-0.30139
S(YexSexCo)	-0.13578	-0.36848
V(Res)	0.62761	0.79222

PERMANOVA – Region B, 4th root transformed, indirect developer biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	30.389	30.389	12.918	0.0094	9839
Se	1	6.6971	6.6971	2.8468	0.1348	9796
Co	1	24.425	24.425	10.383	0.0123	9833
YexSe	1	0.1785	0.1785	7.5879E-2	0.7968	9842
YexCo	1	25.969	25.969	11.039	0.009	9794
SexCo	1	5.0895	5.0895	2.1635	0.1708	9825
YexSexCo	1	0.98904	0.98904	0.42042	0.5369	9810
Res	8	18.82	2.3525			
Total	15	112.56				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	3.5045	1.872
S(Se)	0.54308	0.73694
S(Co)	2.7591	1.6611
S(YexSe)	-0.54349	-0.73722
S(YexCo)	5.9041	2.4298
S(SexCo)	0.68426	0.8272
S(YexSexCo)	-0.68172	-0.82567
V(Res)	2.3525	1.5338

PERMANOVA (Pairwise) – Region B, 4th root transformed, indirect developer biomass data (Euclidean distance).

Term 'YexCo' for pairs of levels of factor 'Year'

Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	7.6086	0.0262	267

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Distance between/within groups

	1	2
1	0.83016	
2	5.3043	1.3231

Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms
1, 2	0.15248	0.8653	270

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	4

Average Distance between/within groups

	1	2
1	1.8471	
2	2.0067	2.9977

Term 'YexCo' for pairs of levels of factor 'Condition'

Within level '1' of factor 'Year'

Groups	t	P(perm)	Unique perms
N-U, U	7.3354	0.0294	262

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	0.83016	
U	5.0191	1.8471

Within level '2' of factor 'Year'

Groups	t	P(perm)	Unique perms
N-U, U	5.6015E-2	0.9121	270

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	4

Average Distance between/within groups

	N-U	U
N-U	1.3231	
U	1.8679	2.9977

PERMANOVA – Region C, 4th root transformed, indirect developer biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	13.507	13.507	4.2926	0.0696	9793
Se	1	3.9502	3.9502	1.2554	0.2905	9783
Co	1	13.765	13.765	4.3747	0.0672	9724
YexSe	1	0.45441	0.45441	0.14442	0.7157	9850
YexCo	1	0.33569	0.33569	0.10669	0.7492	9815
SexCo	1	0.65641	0.65641	0.20862	0.6525	9828
YexSexCo	1	6.3768	6.3768	2.0266	0.1859	9830
Res	8	25.172	3.1465			
Total	15	64.217				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	1.295	1.138
S(Se)	0.10045	0.31694
S(Co)	1.3273	1.1521
S(YexSe)	-0.67303	-0.82038
S(YexCo)	-0.70271	-0.83828
S(SexCo)	-0.62253	-0.789
S(YexSexCo)	1.6152	1.2709
V(Res)	3.1465	1.7738

PERMANOVA – Region D, 4th root transformed, indirect developer biomass data (Euclidean distance).

PERMANOVA table of results

Source	df	SS	MS	Pseudo-F	P(perm)	Unique perms
Ye	1	0.15218	0.15218	5.4516	0.0492	9833
Se	1	2.1317	2.1317	76.365	0.0004	9747
Co	1	0.39705	0.39705	14.224	0.0065	9820
YexSe	1	2.2193E-4	2.2193E-4	7.9502E-3	0.9225	9798
YexCo	1	4.3393E-2	4.3393E-2	1.5545	0.245	9795
SexCo	1	0.14087	0.14087	5.0465	0.0524	9814
YexSexCo	1	0.27517	0.27517	9.8577	0.018	9816
Res	8	0.22332	2.7915E-2			
Total	15	3.3639				

Details of the expected mean squares (EMS) for the model

Source	EMS
Ye	1*V(Res) + 8*S(Ye)
Se	1*V(Res) + 8*S(Se)
Co	1*V(Res) + 8*S(Co)
YexSe	1*V(Res) + 4*S(YexSe)
YexCo	1*V(Res) + 4*S(YexCo)
SexCo	1*V(Res) + 4*S(SexCo)
YexSexCo	1*V(Res) + 2*S(YexSexCo)
Res	1*V(Res)

Construction of Pseudo-F ratio(s) from mean squares

Source	Numerator	Denominator	Num.df	Den.df
Ye	1*Ye	1*Res	1	8
Se	1*Se	1*Res	1	8
Co	1*Co	1*Res	1	8
YexSe	1*YexSe	1*Res	1	8
YexCo	1*YexCo	1*Res	1	8
SexCo	1*SexCo	1*Res	1	8
YexSexCo	1*YexSexCo	1*Res	1	8

Estimates of components of variation

Source	Estimate	Sq.root
S(Ye)	1.5533E-2	0.12463
S(Se)	0.26297	0.51281
S(Co)	4.6142E-2	0.21481
S(YexSe)	-6.9232E-3	-8.3206E-2
S(YexCo)	3.8696E-3	6.2206E-2
S(SexCo)	2.824E-2	0.16805
S(YexSexCo)	0.12363	0.35161
V(Res)	2.7915E-2	0.16708

PERMANOVA (Pairwise) – Region D, 4th root transformed, indirect developer biomass data (Euclidean distance).

Term 'YexSexCo' for pairs of levels of factor 'Year'

Within level 'W' of factor 'Season'
Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
1, 2	2.9728	0.3388	3	0.0976

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	2

Average Distance between/within groups

	1	2
1	6.1066E-2	
2	0.34573	0.22444

Within level 'W' of factor 'Season'
Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
1, 2	0.14714	1	3	0.8955

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	2

Average Distance between/within groups

	1	2
1	0.39855	
2	0.19927	4.0752E-2

Within level 'S' of factor 'Season'
Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
1, 2	1.1918	0.6694	3	0.3527

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	2

Average Distance between/within groups

	1	2
1	0.11755	
2	0.17354	0.24874

Within level 'S' of factor 'Season'
Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
1, 2	2.8778	0.33	3	0.1054

Denominators

Groups	Denominator	Den.df
1, 2	1*Res	2

Average Distance between/within groups

	1	2
1	0.10107	
2	0.56894	0.38227

Term 'YexSexCo' for pairs of levels of factor 'Season'

Within level '1' of factor 'Year'
Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
W, S	4.3411	0.3395	3	0.0494

Denominators

Groups	Denominator	Den.df
W, S	1*Res	2

Average Distance between/within groups

	W	S
W	6.1066E-2	
S	0.28752	0.11755

Within level '1' of factor 'Year'
Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
W, S	5.7759	0.3269	3	0.0289

Denominators

Groups	Denominator	Den.df
W, S	1*Res	2

Average Distance between/within groups

	W	S
W	0.39855	
S	1.1874	0.10107

Within level '2' of factor 'Year'
Within level 'N-U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
W, S	4.759	0.3349	3	0.0414

Denominators

Groups	Denominator	Den.df
W, S	1*Res	2

Average Distance between/within groups

	W	S
W	0.22444	
S	0.79719	0.24874

Within level '2' of factor 'Year'
Within level 'U' of factor 'Condition'

Groups	t	P(perm)	Unique perms	P(MC)
W, S	3.3709	0.3381	3	0.0767

Denominators

Groups	Denominator	Den.df
W, S	1*Res	2

Average Distance between/within groups

	W	S
W	4.0752E-2	
S	0.64795	0.38227

Term 'YexSexCo' for pairs of levels of factor 'Condition'

Within level '1' of factor 'Year'
Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	3.2781	0.332	3	0.0817

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	2

Average Distance between/within groups

	N-U	U
N-U	6.1066E-2	
U	0.66086	0.39855

Within level '1' of factor 'Year'
Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	3.084	0.341	3	0.0914

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	2

Average Distance between/within groups

	N-U	U
N-U	0.11755	
U	0.23904	0.10107

Within level '2' of factor 'Year'
Within level 'W' of factor 'Season'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	3.0214	0.3298	3	0.0935

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	2

Average Distance between/within groups

	N-U	U
N-U	0.22444	
U	0.3446	4.0752E-2

Within level '2' of factor 'Year'
Within level 'S' of factor 'Season'

Groups	t	P(perm)	Unique perms	P(MC)
N-U, U	2.1656	0.34	3	0.1609

Denominators

Groups	Denominator	Den.df
N-U, U	1*Res	2

Average Distance between/within groups

	N-U	U
N-U	0.24874	
U	0.49384	0.38227

PERMDISP – Region A, 4th root transformed, indirect developer biomass data (Euclidean distance).

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 5.5372 df1: 1 df2: 14
P(perm): 0.07

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	2.3531	6.8E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.84035	0.16399
S	8	0.39775	9.2113E-2

PERMDISP – Region B, 4th root transformed, indirect developer biomass data (Euclidean distance).

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 4.5052 df1: 1 df2: 14
P(perm): 0.0535

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	2.1225	4.9E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	2.5095	0.4025
2	8	1.2914	0.40907

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 5.365 df1: 1 df2: 14
P(perm): 0.0405

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	2.3163	4.01E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	2.6521	0.29722
U	8	1.4848	0.40701

PERMDISP – Region D, 4th root transformed, indirect developer biomass data (Euclidean distance).

Group factor: Condition
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 3.1073 df1: 1 df2: 14
P(perm): 0.0989

PAIRWISE COMPARISONS

Groups	t	P(perm)
(N-U,U)	1.7627	9.15E-2

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
N-U	8	0.27118	6.1427E-2
U	8	0.46303	8.9849E-2

Group factor: Season
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 0.62882 df1: 1 df2: 14
P(perm): 0.4406

PAIRWISE COMPARISONS

Groups	t	P(perm)
(W,S)	0.79298	0.4391

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
W	8	0.25979	5.8741E-2
S	8	0.19335	5.9759E-2

Group factor: Year
Number of permutations: 9999
Number of groups: 2
Number of samples: 16

DEVIATIONS FROM CENTROID
F: 7.9956E-3 df1: 1 df2: 14
P(perm): 0.9257

PAIRWISE COMPARISONS

Groups	t	P(perm)
(1,2)	8.9418E-2	0.9279

MEANS AND STANDARD ERRORS

Group	Size	Average	SE
1	8	0.36873	0.1024
2	8	0.38048	8.224E-2

ANOSIM – Region A, 4th root transformed, indirect developer biomass data (Euclidean distance).

Season
Global Test
Sample statistic (Global R): 0.434
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample from 6435)
Number of permuted statistics greater than or equal to Global R: 0

ANOSIM – Region B, 4th root transformed, indirect developer biomass data (Euclidean distance).

Condition (across Y1)
Global Test
Sample statistic (Global R): 0.927
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Year (across Non-upwelling)
Global Test
Sample statistic (Global R): 1
Significance level of sample statistic: 2.9%
Number of permutations: 35 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

ANOSIM – Region D, 4th root transformed, indirect developer biomass data (Euclidean distance).

Season (across Non-upwelling, year 2)
Global Test
Sample statistic (Global R): 1
Significance level of sample statistic: 33.3%
Number of permutations: 3 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Season (across Non-upwelling, Year 1)
Global Test
Sample statistic (Global R): 1
Significance level of sample statistic: 33.3%
Number of permutations: 3 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Season (across upwelling, Year 2)
Global Test
Sample statistic (Global R): 1
Significance level of sample statistic: 33.3%
Number of permutations: 3 (All possible permutations)
Number of permuted statistics greater than or equal to Global R: 1

Biomass DistLM

Group variables, Indicator: Type
Selection criterion: AIC
Selection procedure: Specified

GROUPS

1	Slope	Exclude
2	BI	Trial
3	Gs	Exclude
4	Up	Exclude
5	Lat	Trial
6	Sea	Exclude

Total SS(trace): 1.1423E5

MARGINAL TESTS

Group	SS(trace)	Pseudo-F	P	Prop.	res.df	regr.df
BI	11397	6.8711	0.0003	9.9767E-2	62	2
Lat	41192	34.966	0.0001	0.3606	62	2

NO STARTING TERMS
SEQUENTIAL TESTS

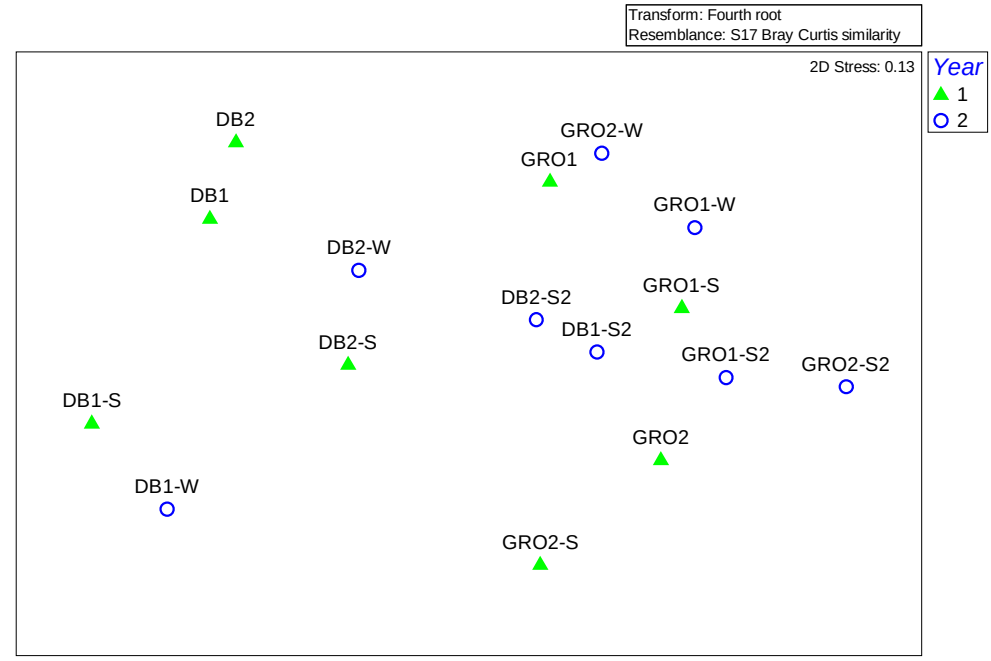
Group	AIC	SS(trace)	Pseudo-F	P	Prop.	Cumul.	res.df	regr.df
+BI	476.45	11397	6.8711	0.0001	9.9767E-2	9.9767E-2	62	2
+Lat	447.12	39806	38.525	0.0001	0.34847	0.44824	61	3

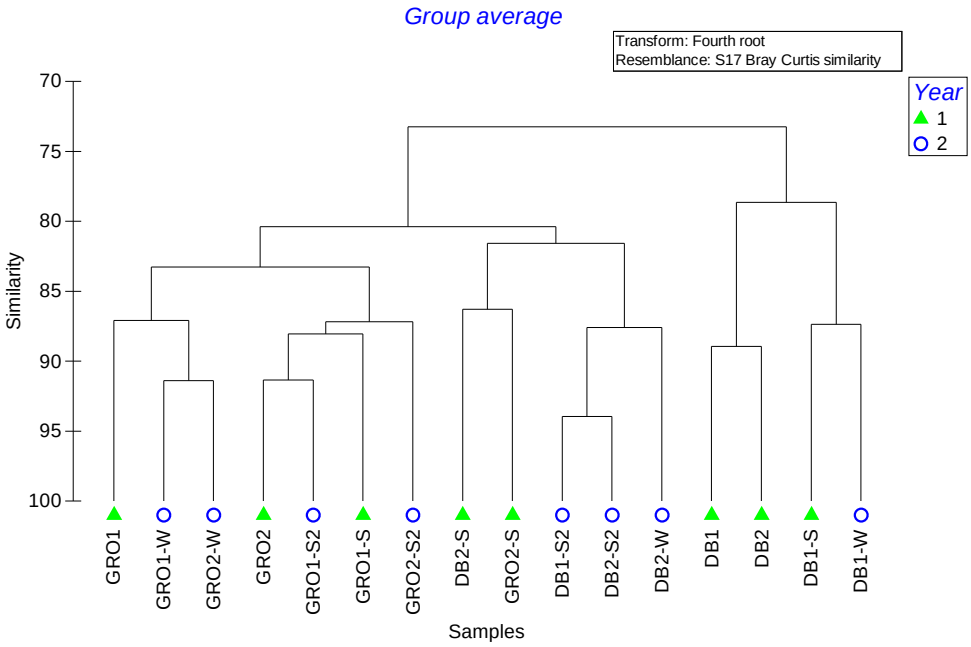
Specified solution

AIC	R^2	RSS	No.Groups	Selections
447.12	0.44824	63029	2	2,5

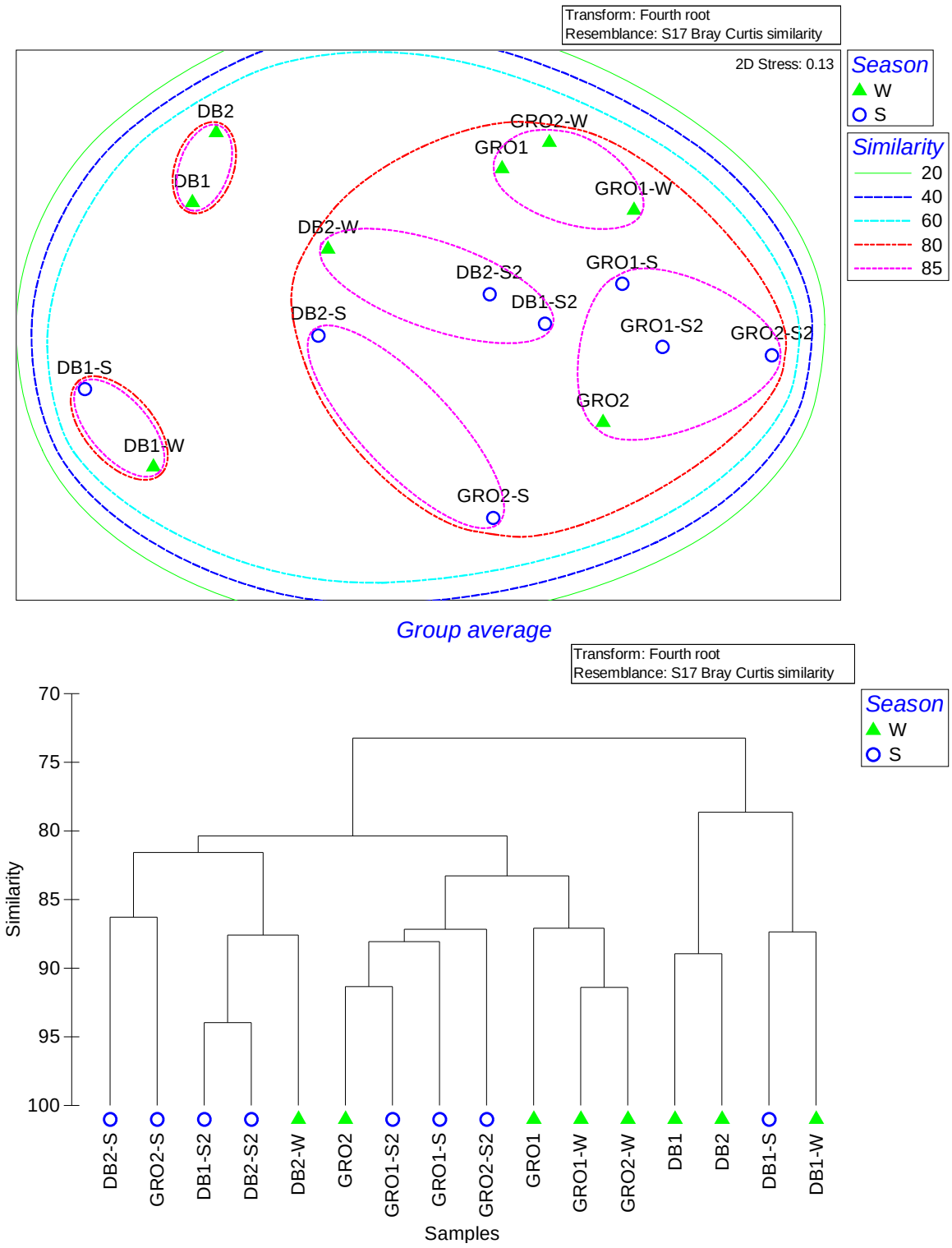
nMDS and CLUSTER plots of "significant" interactions as determined by PERMANOVA analyses, but rejected during visualisation of the data

Labels are old site names and can be ignored. Similarity levels are occasionally superimposed on the plots. The effect being tested is written underneath each set of plots.

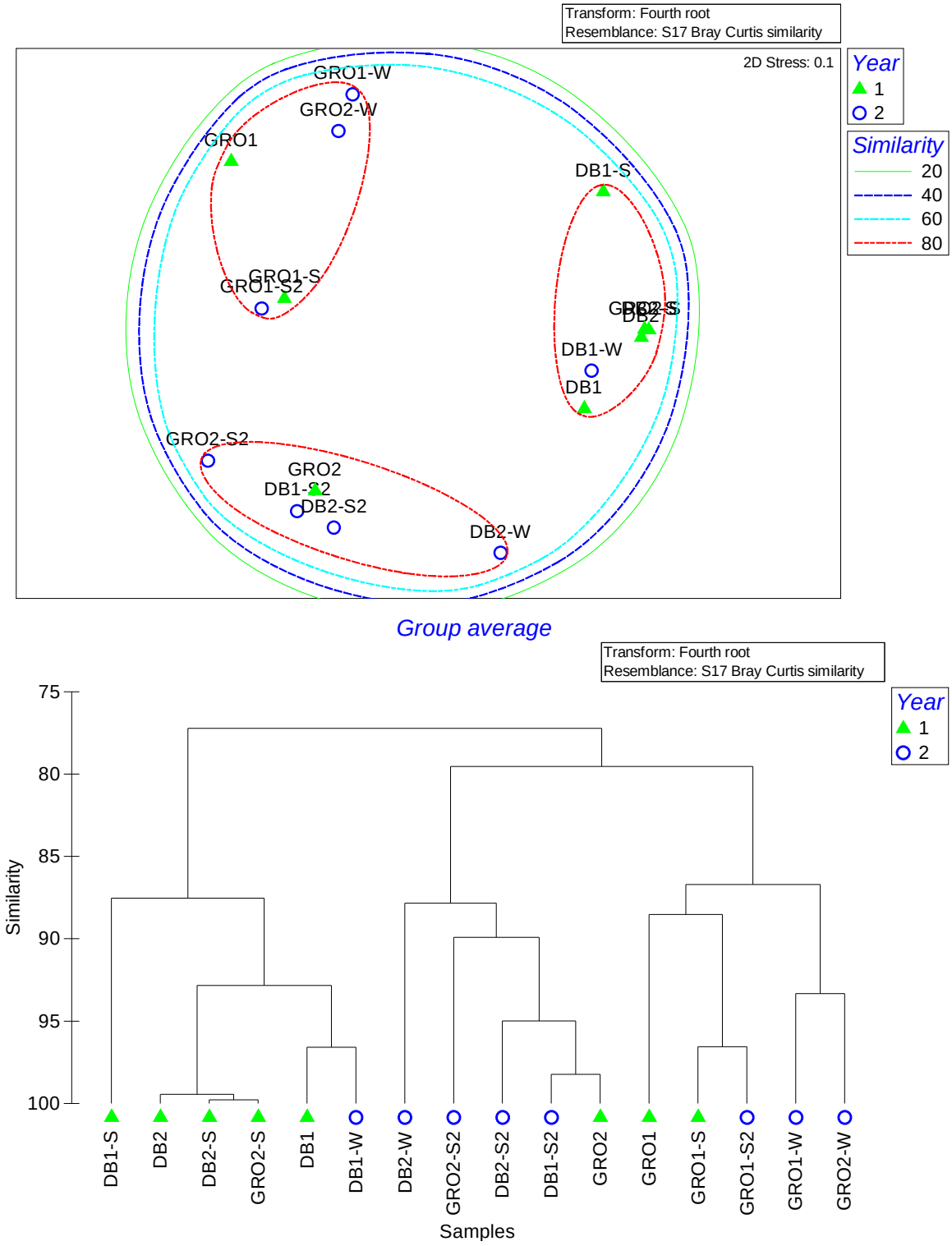




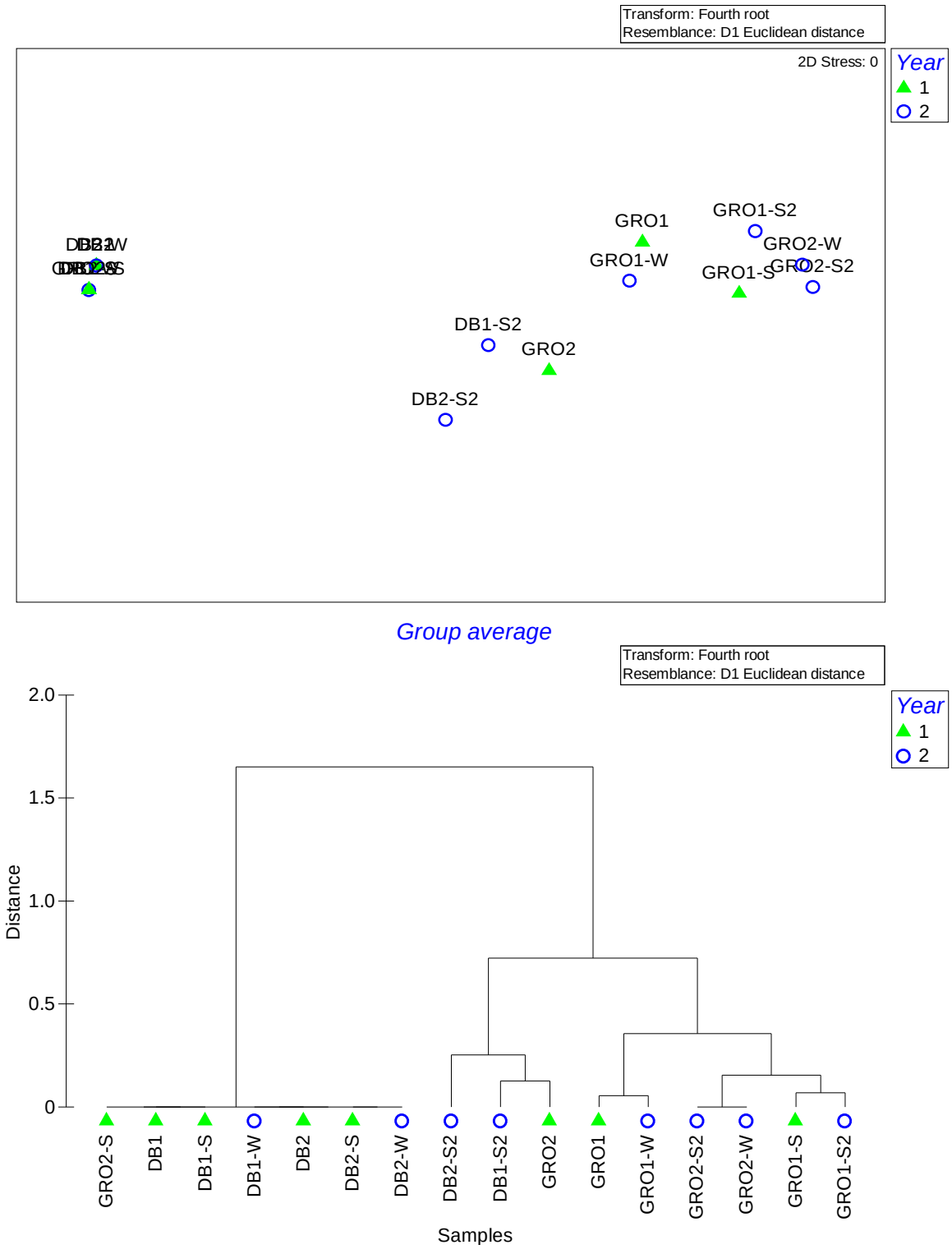
Region A, Order abundance (P =0.0257). Factor: Year (1 and 2).



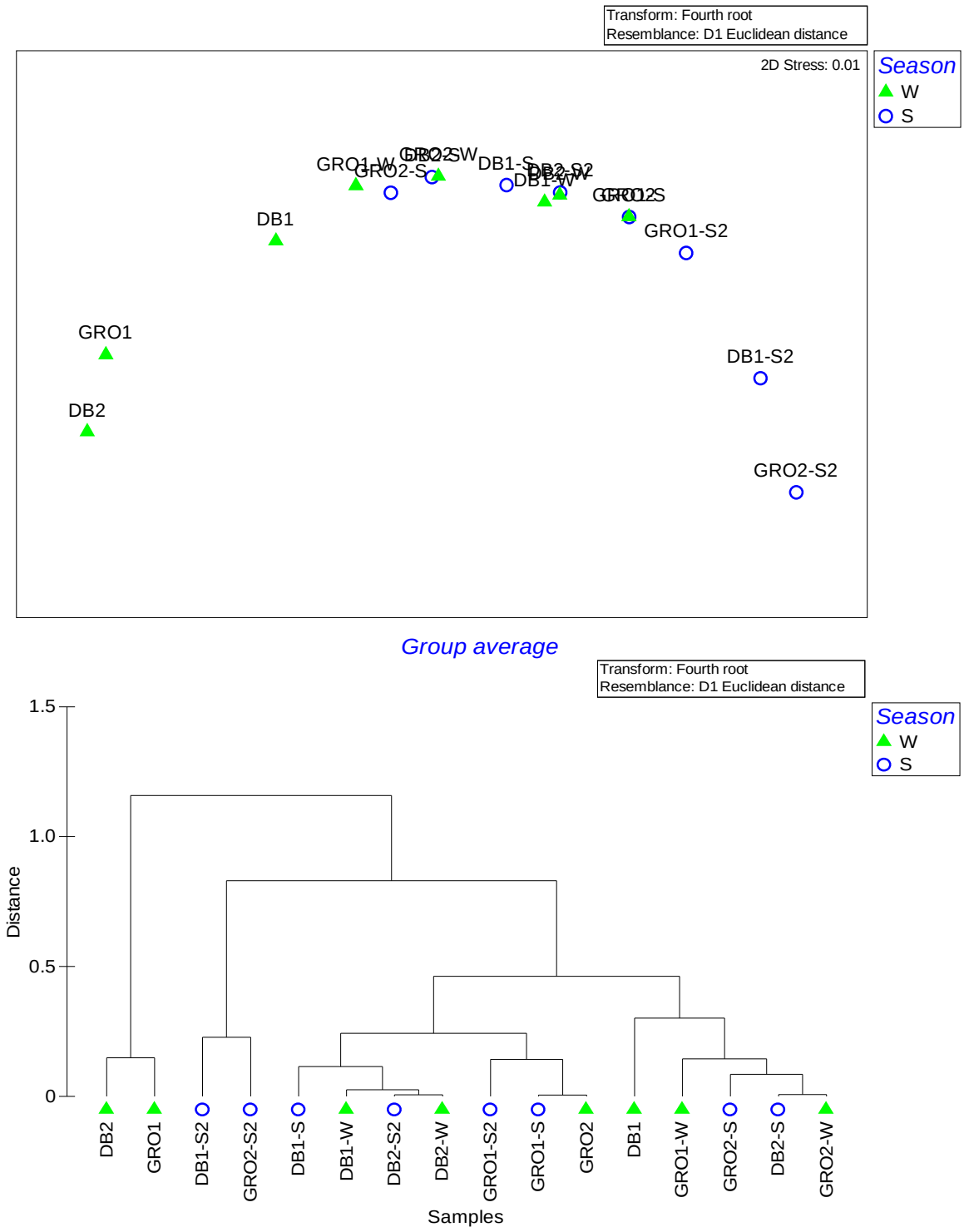
Region A, Order abundance (P=0.0413). Factor: Season (Winter [W] and summer [S])



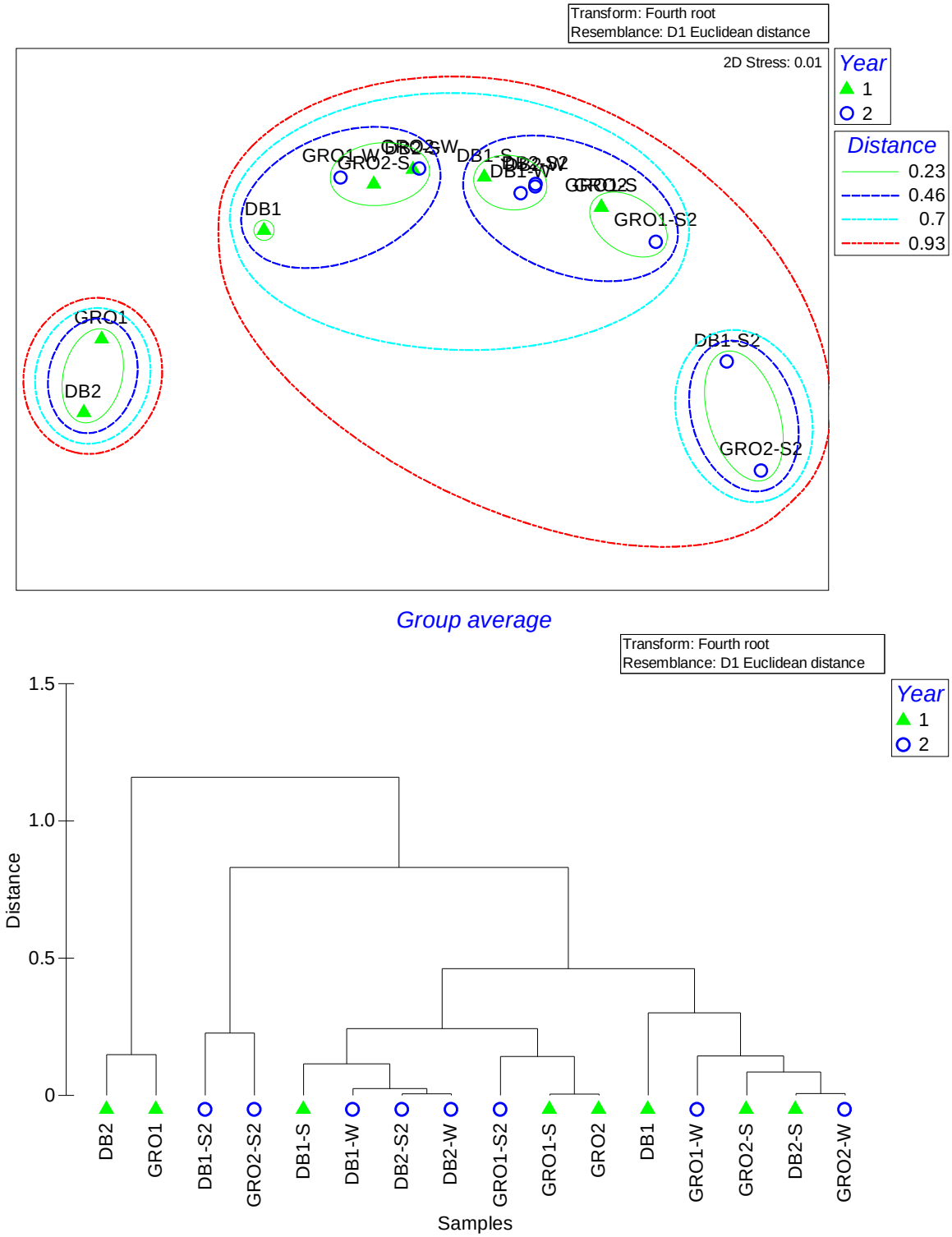
Region A, Phyla abundance (P =0.0354). Factor: Year (1 and 2).



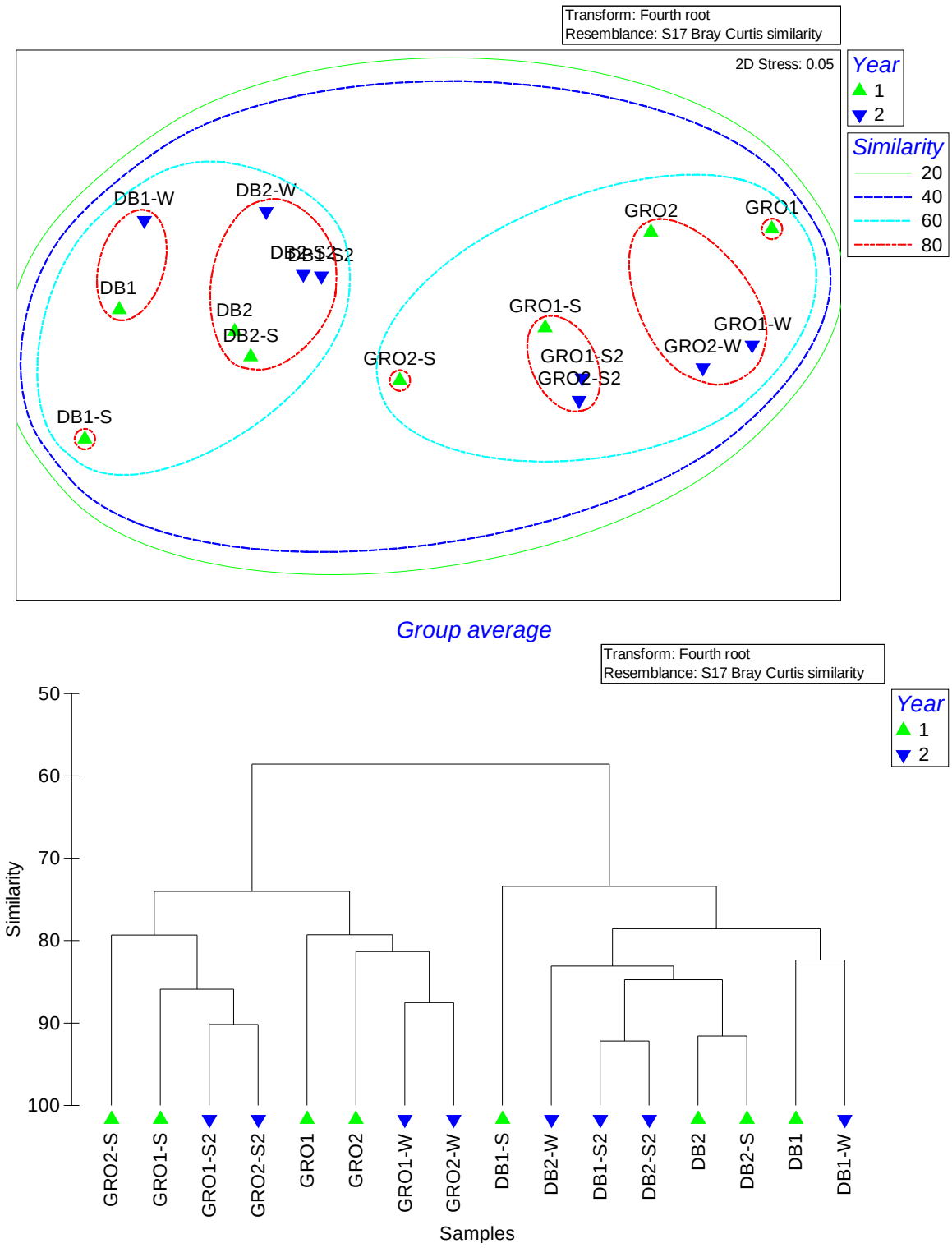
Region A, univariate predator abundance (P = 0.0177). Factor: Year (1 and 2).



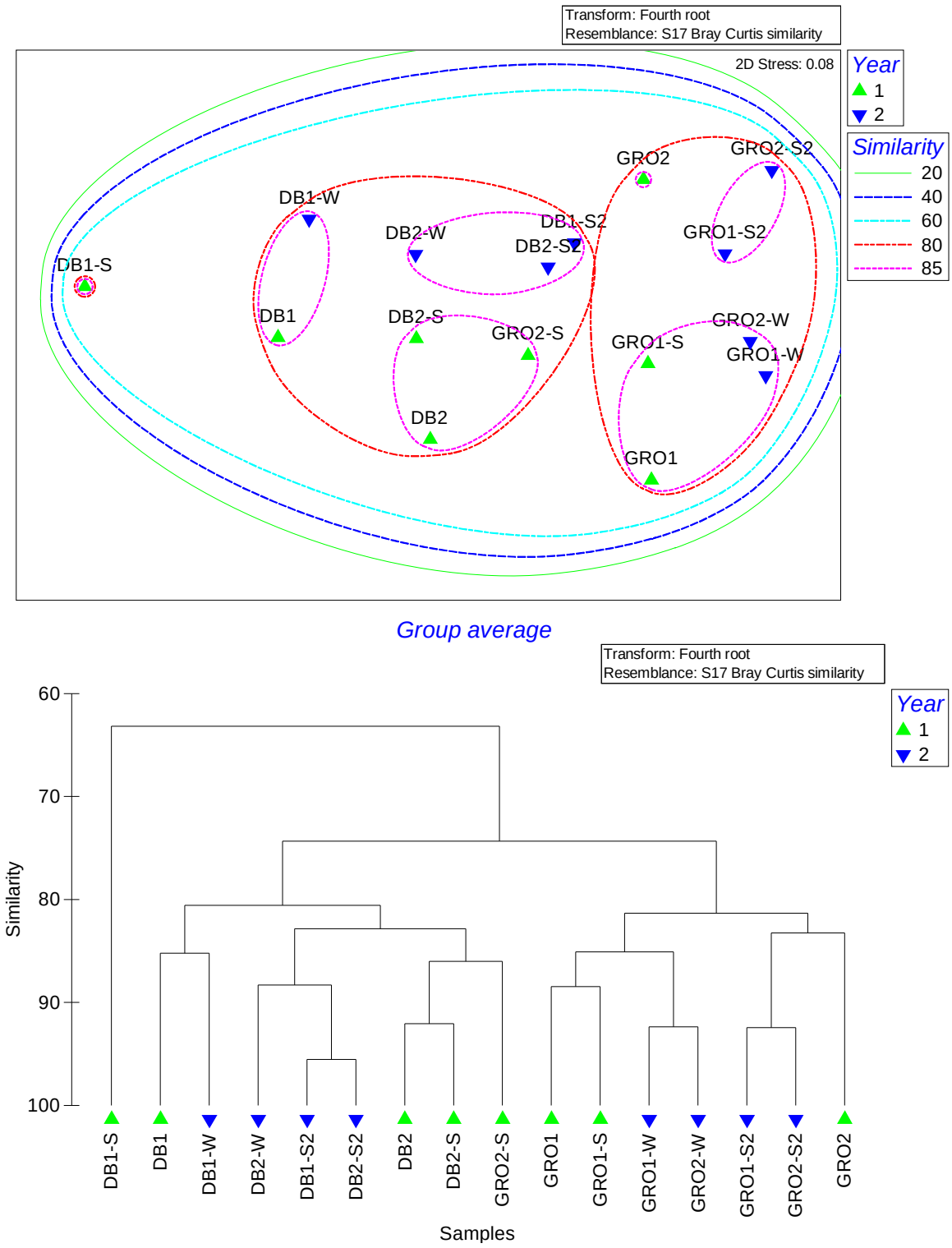
Region A, univariate direct developer abundance (P = 0.0231). Factor: Season (winter [W] and summer [S]).



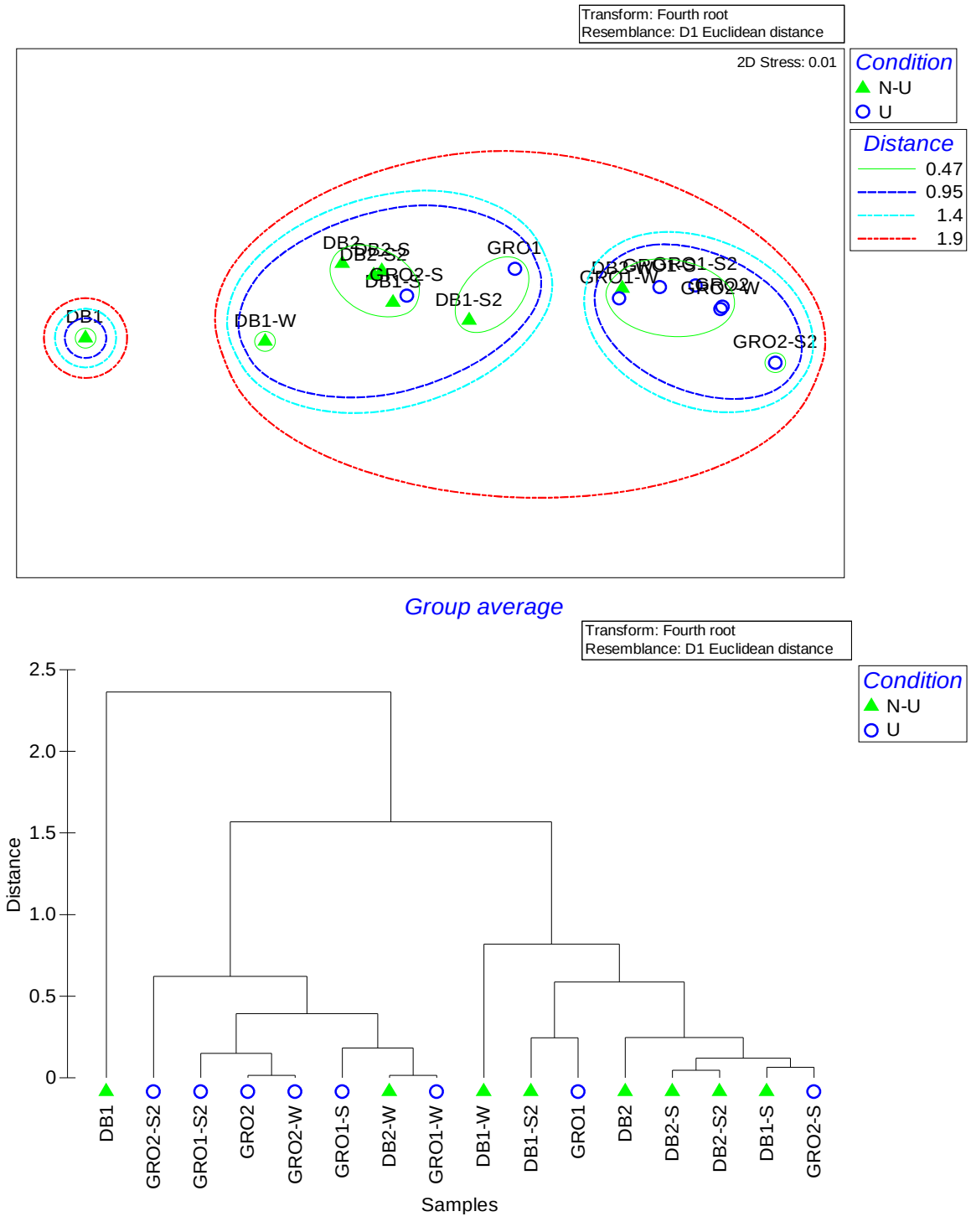
Region A, univariate direct developer abundance (P = 0.0332). Factor: Year (1 and 2).



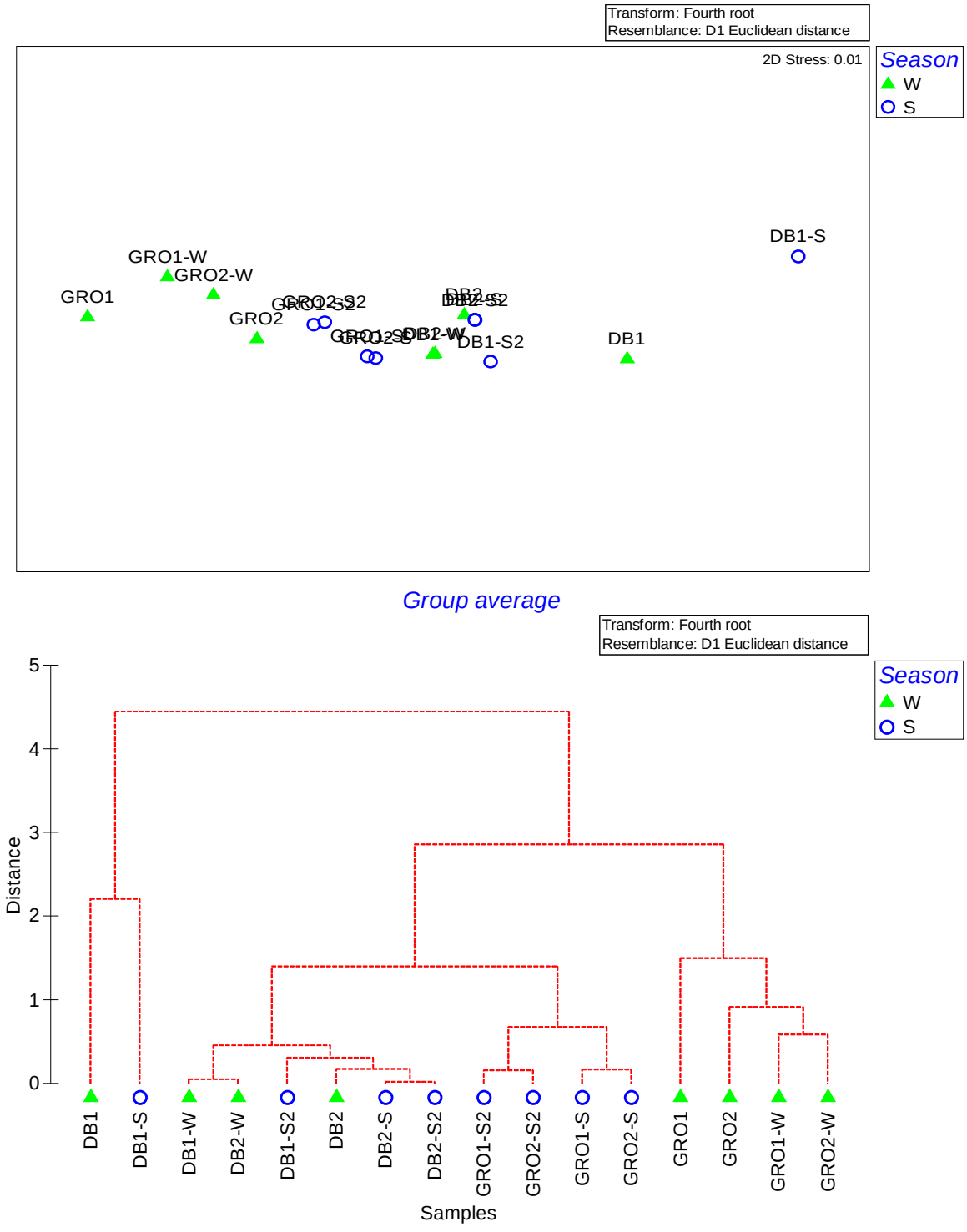
Region A, species biomass (P = 0.0281). Factor: Year (1 and 2).



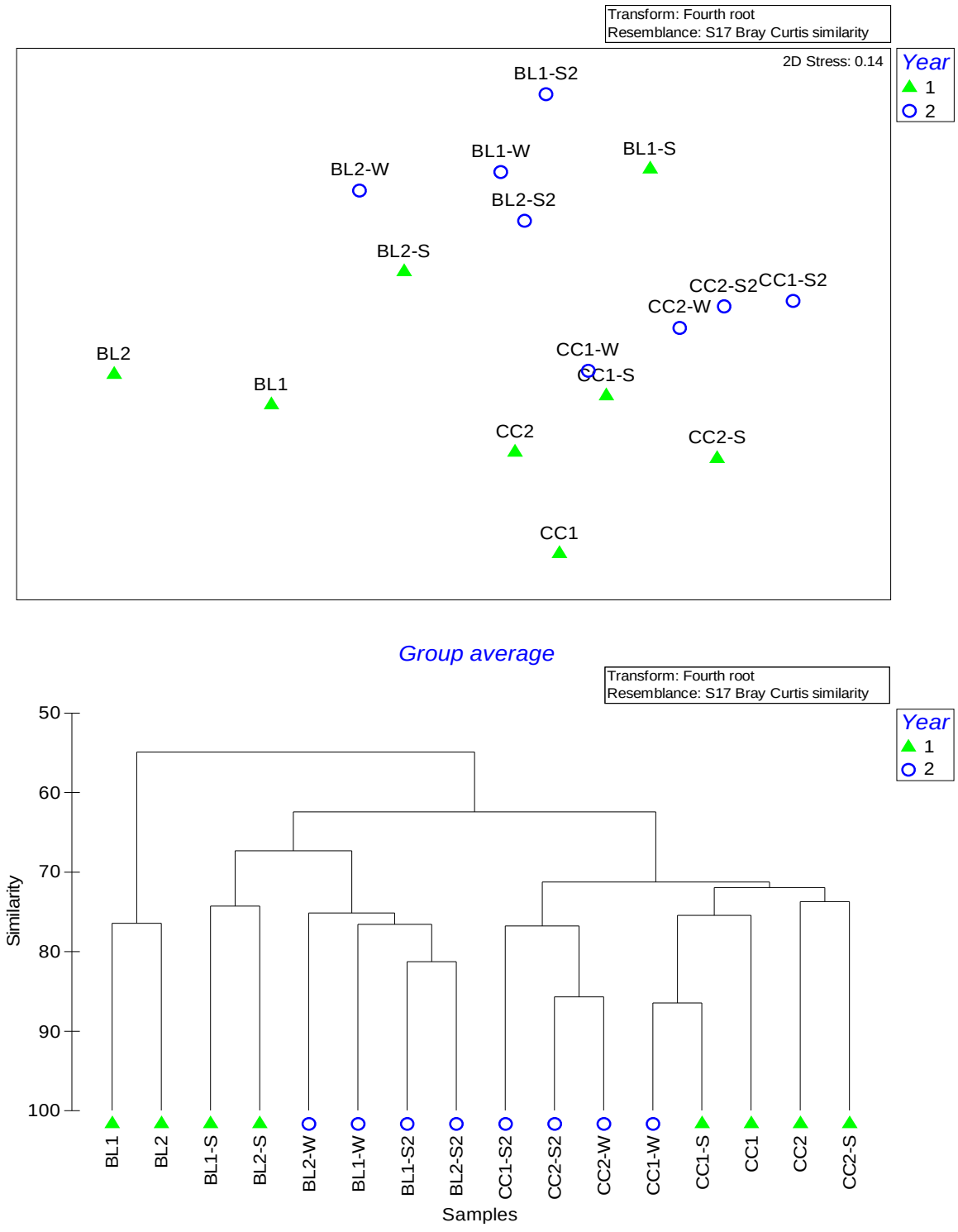
Region A, order biomass (P = 0.011). Factor: Year (1 and 2).



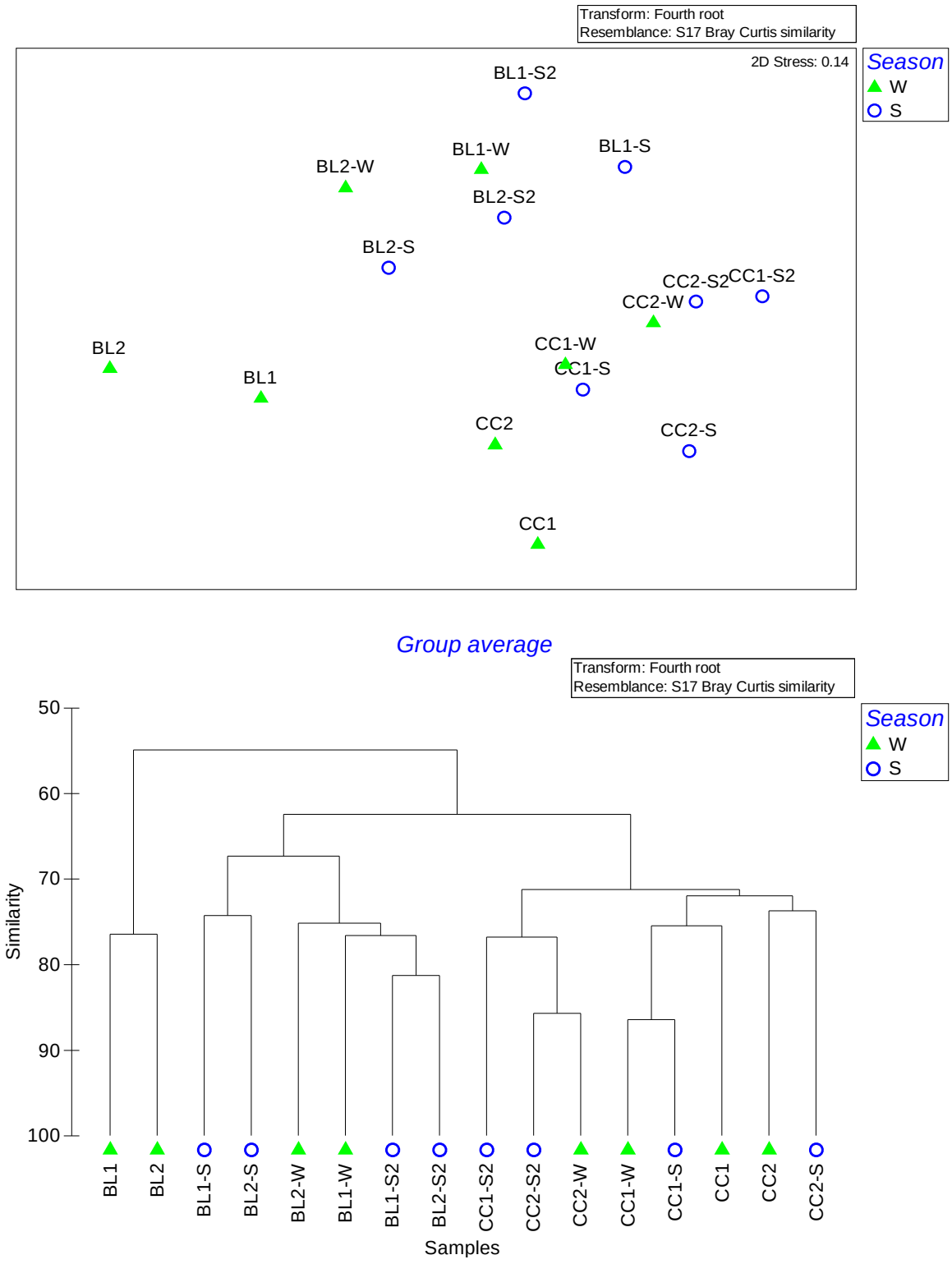
Region A, univariate deposit feeder biomass (P = 0.0046). Factor: Condition (upwelling [U] and non-upwelling [N-U]).



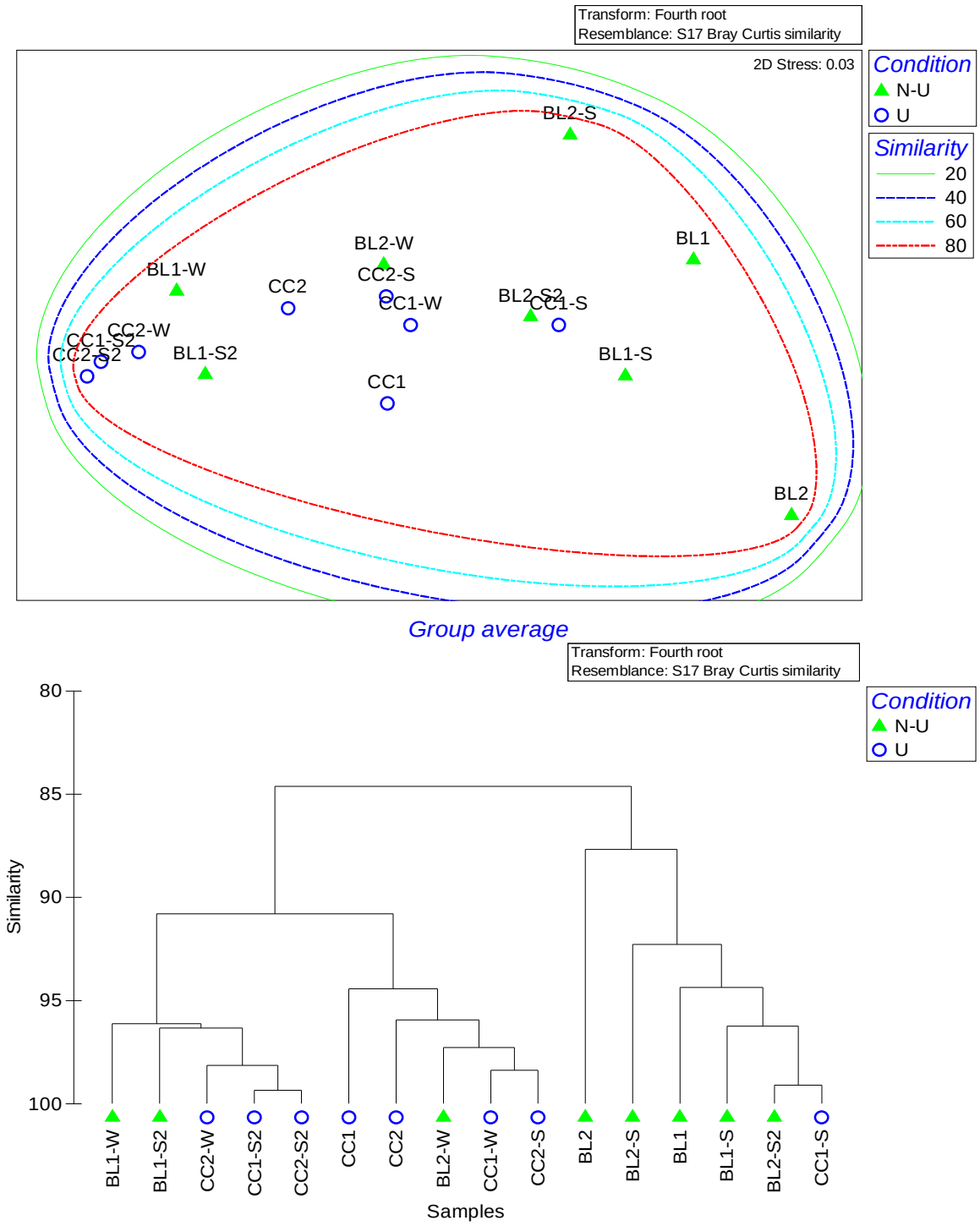
Region A, univariate direct developer biomass (P = 0.0475). Factor: Season (winter [W] and summer [S]).



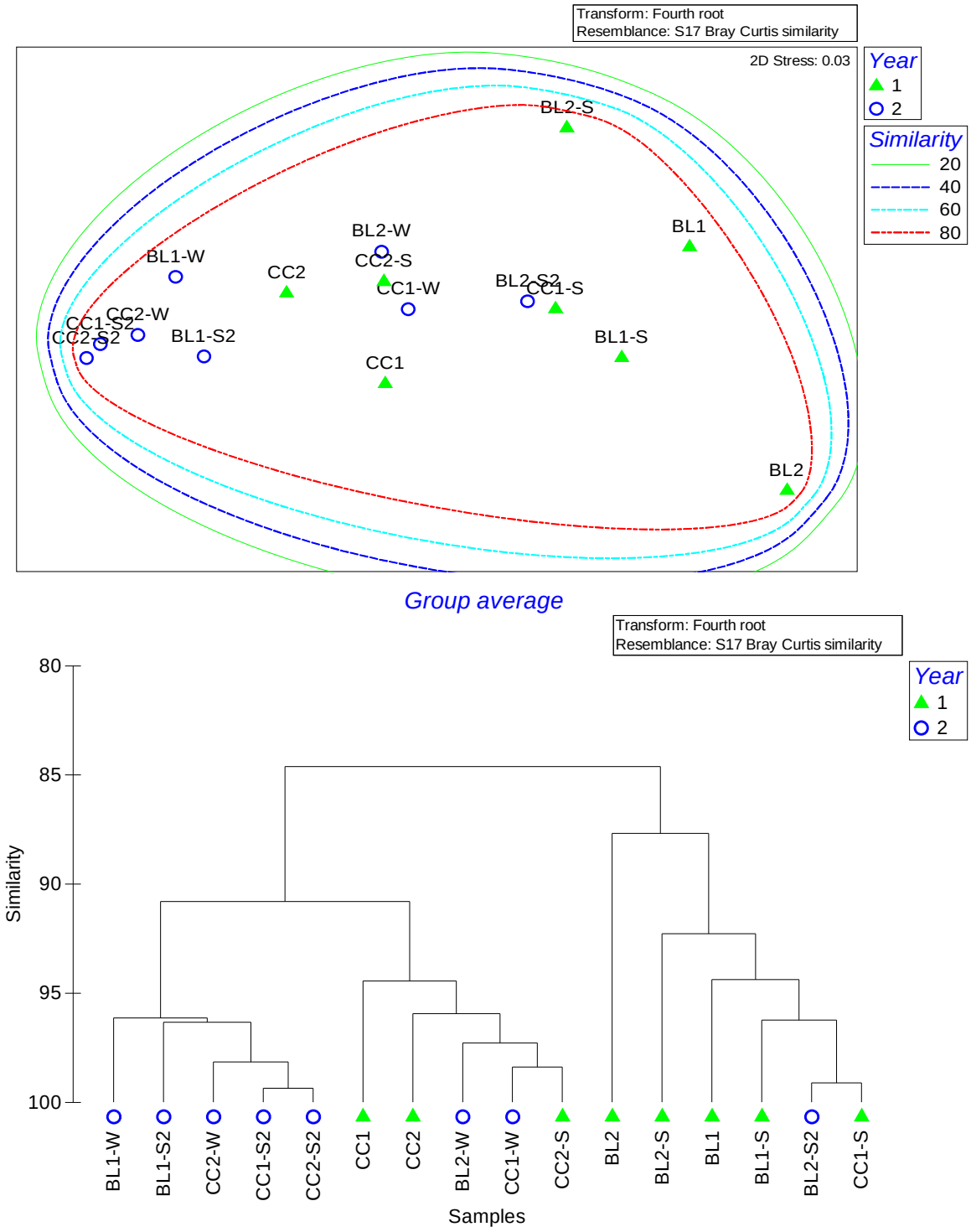
Region B, species abundance (P = 0.0044). Factor: Year (1 and 2).



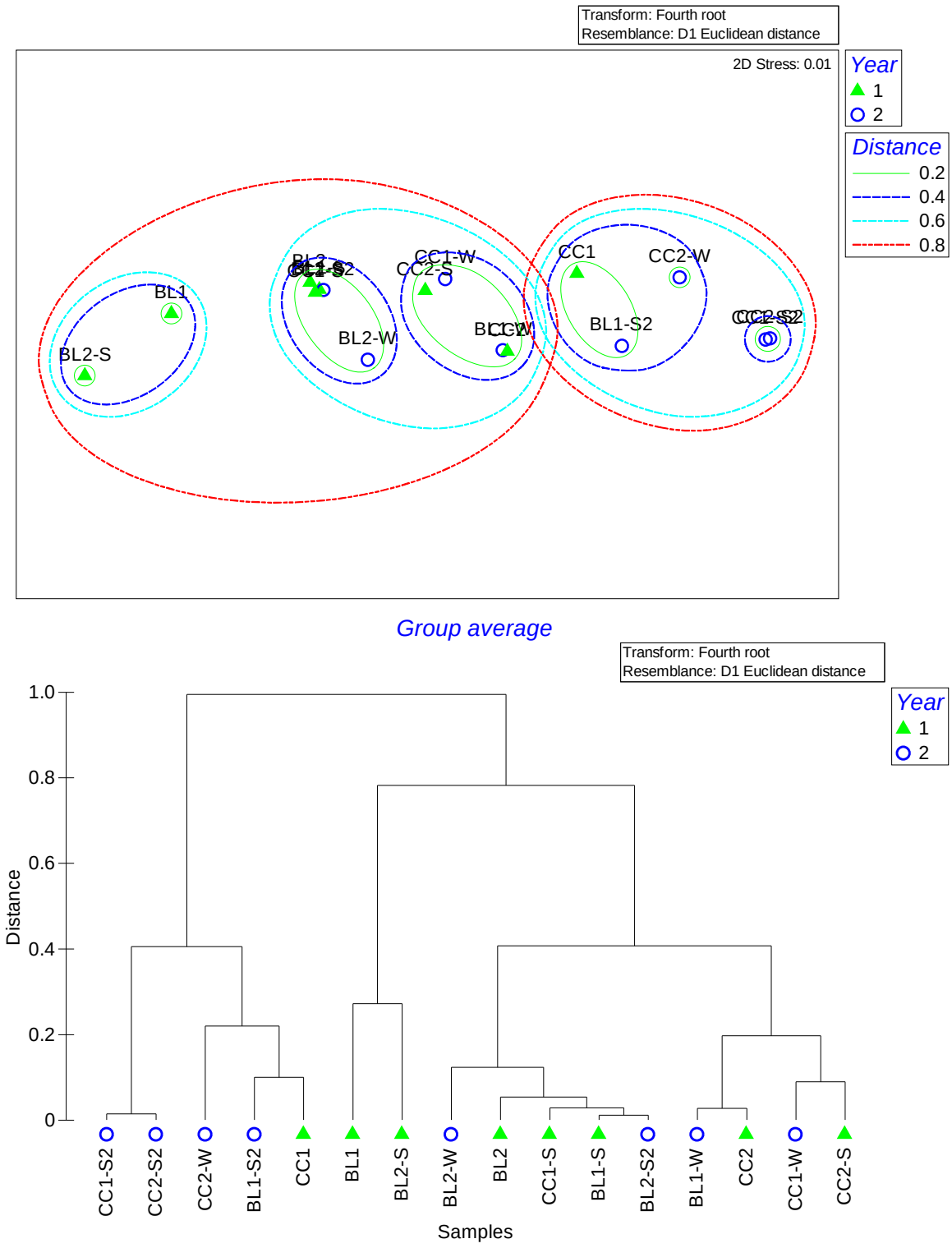
Region B, species abundance (P = 0.0042). Factor: Season (winter [W] and summer [S]).



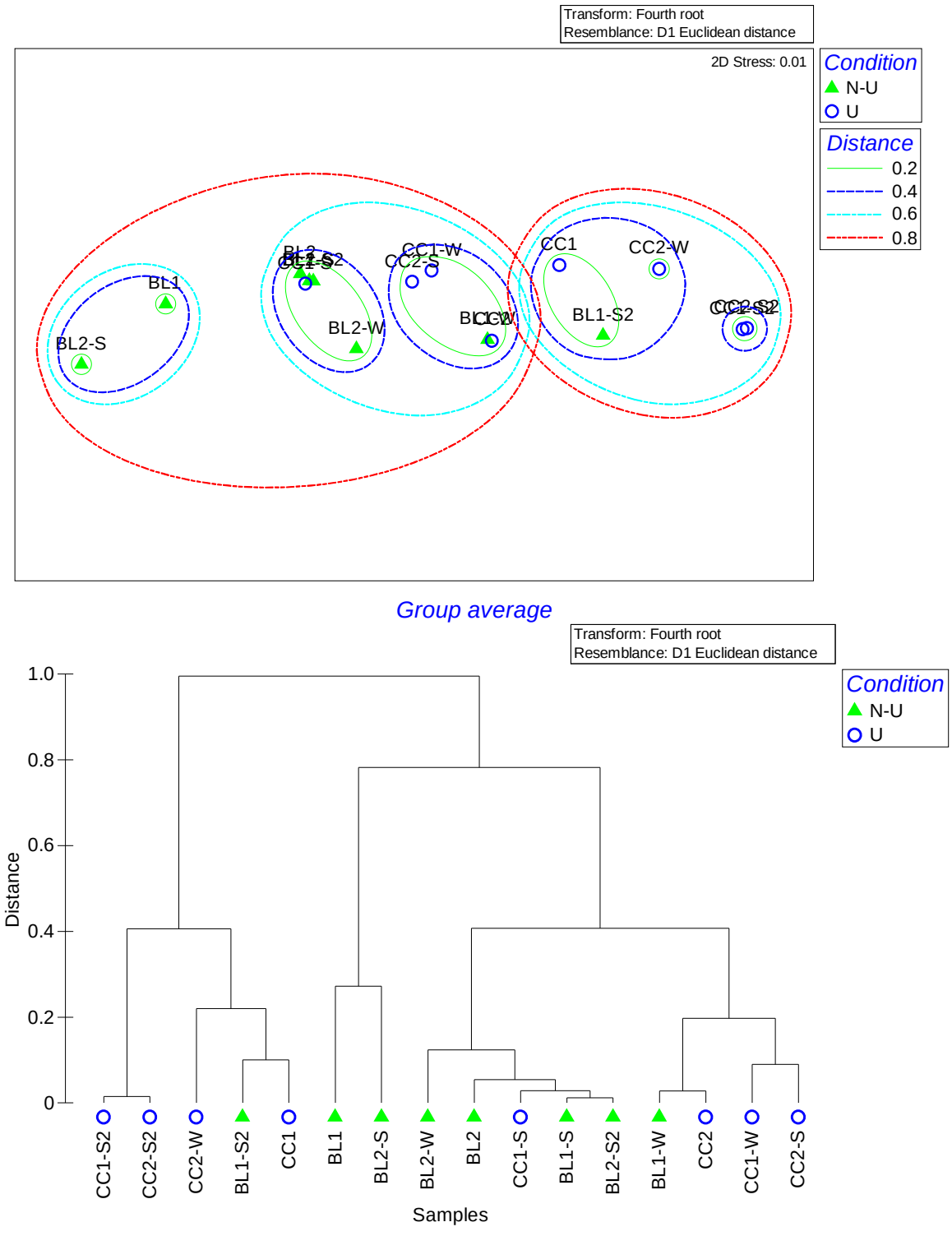
Region B, both reproductive modes abundance (P = 0.0187). Factor: Condition (upwelling [U] and non-upwelling[N-U]).



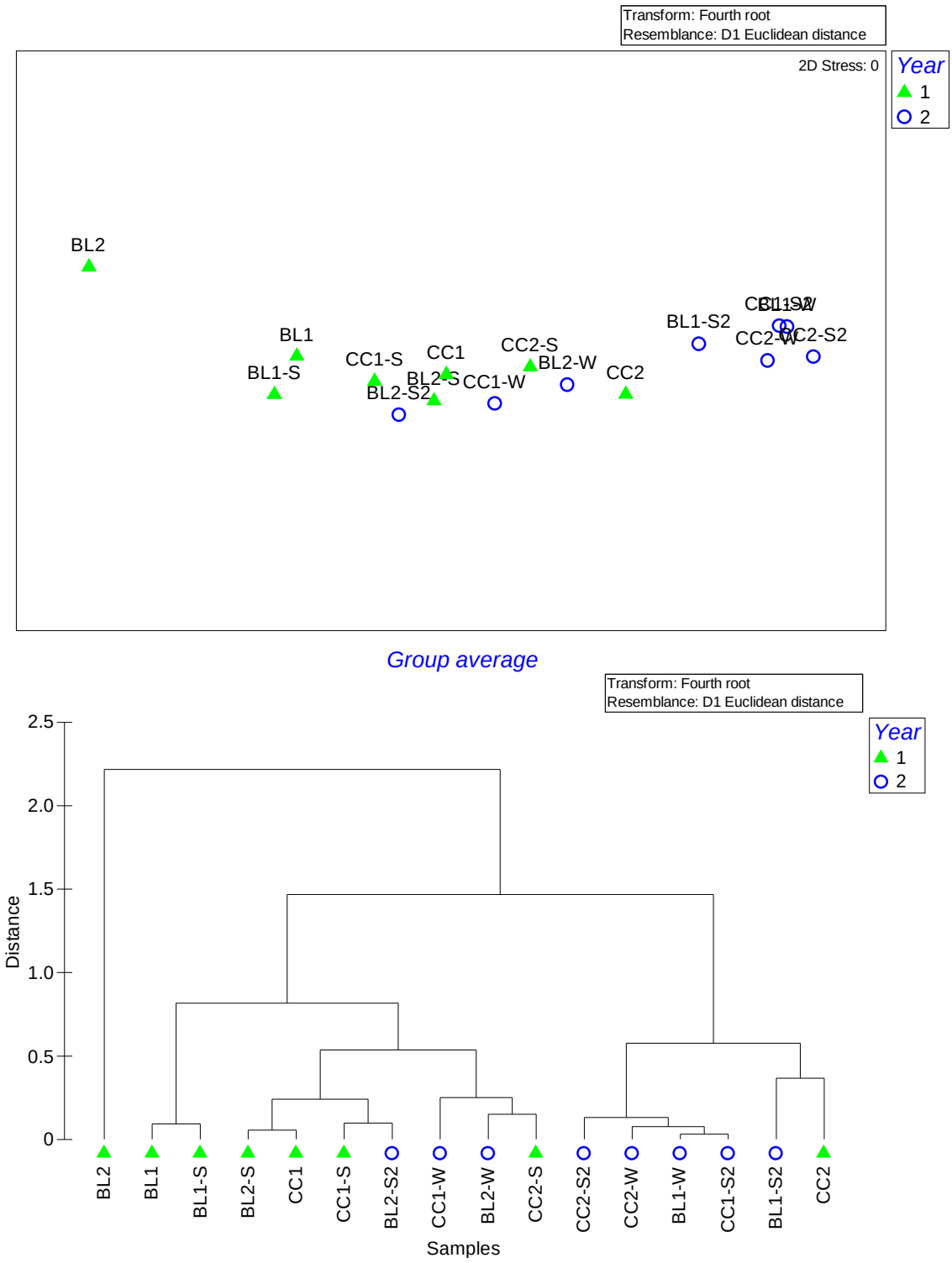
Region B, both modes of reproduction abundance (P = 0.0046). Factor: Year (1 and 2).



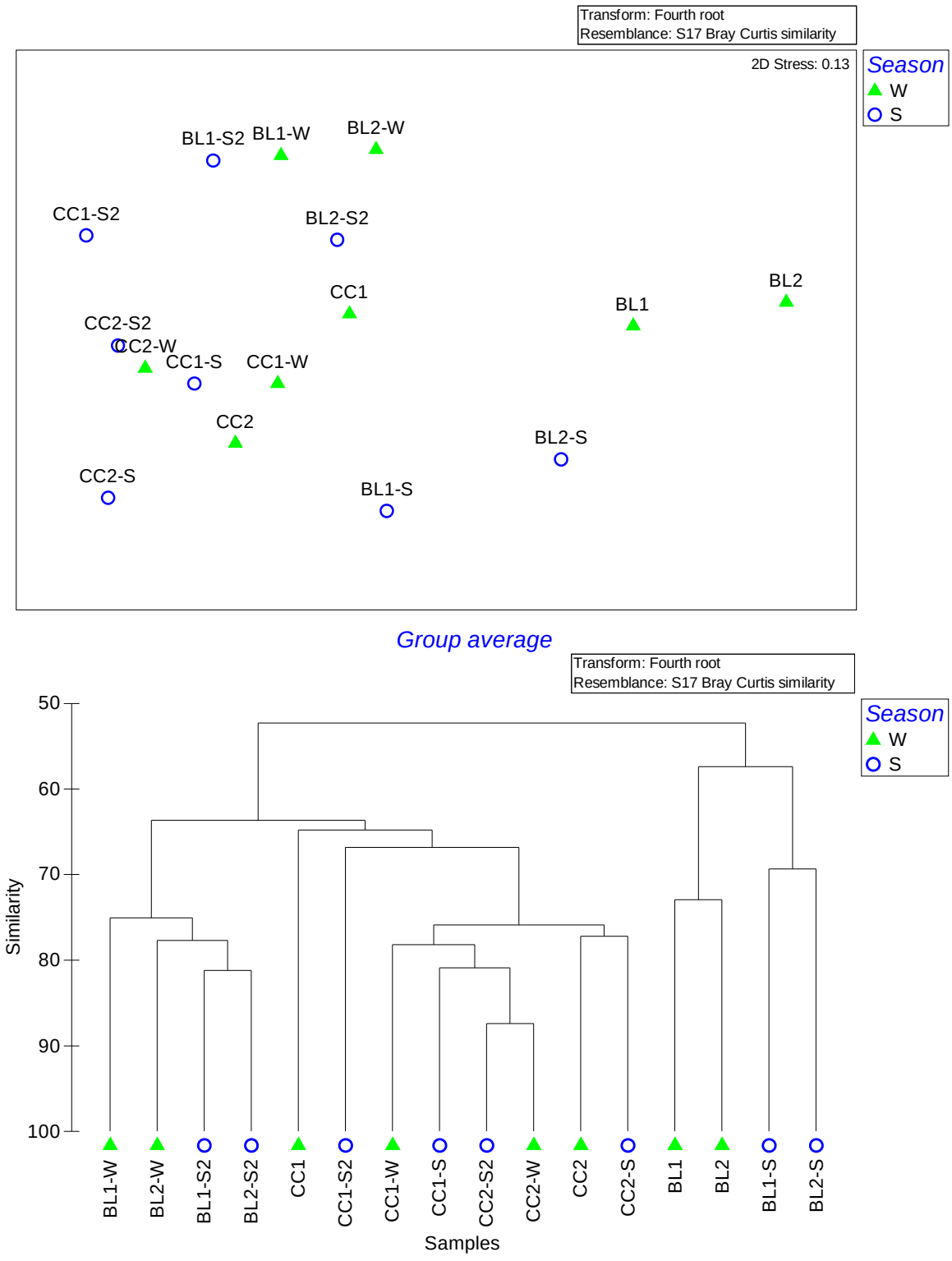
Region B, univariate direct developer abundance (P = 0.0094). Factor: Year (1 and 2).



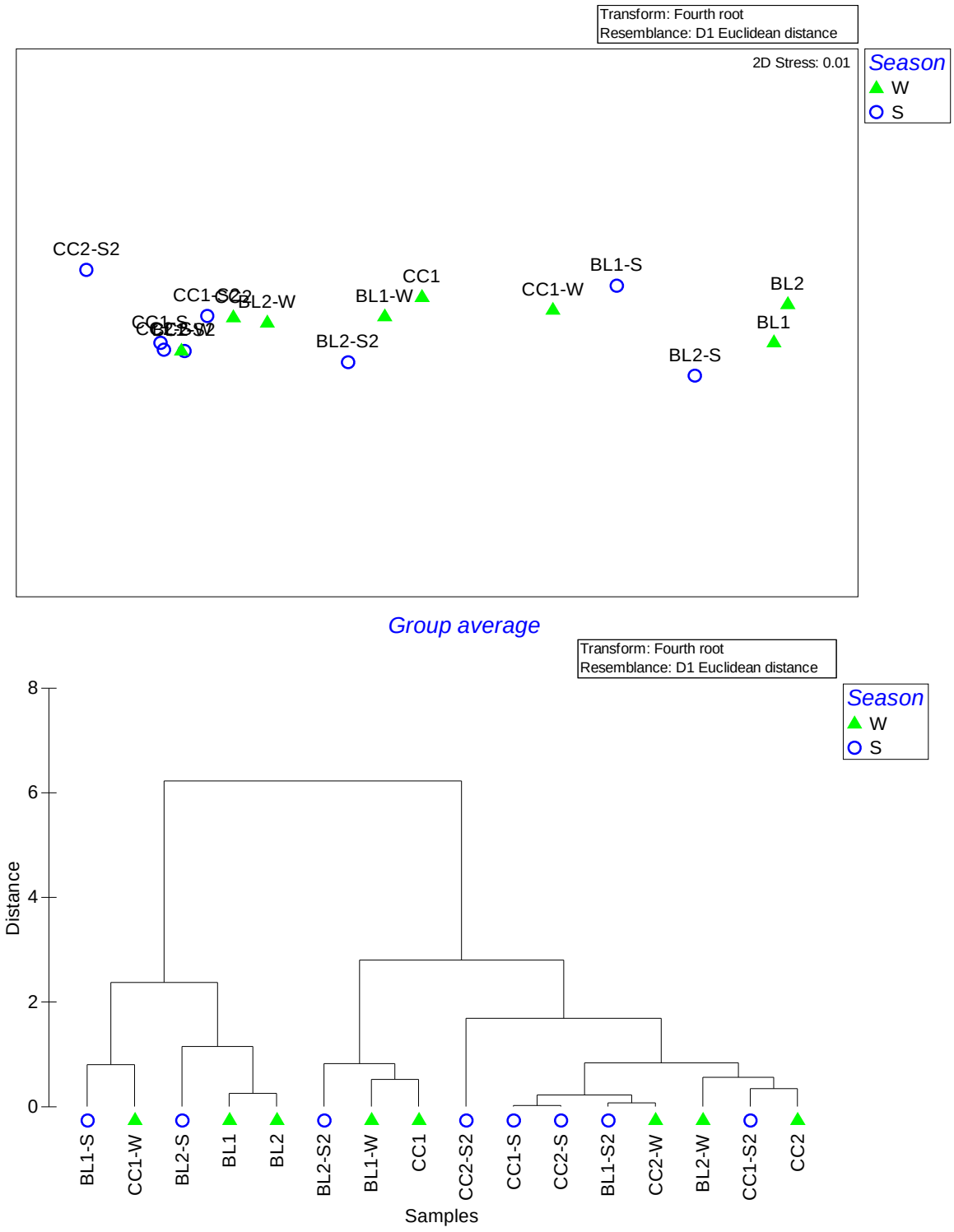
Region B, univariate direct developer abundance (P = 0.01). Factor: Condition (upwelling [U] and non-upwelling [N-U])



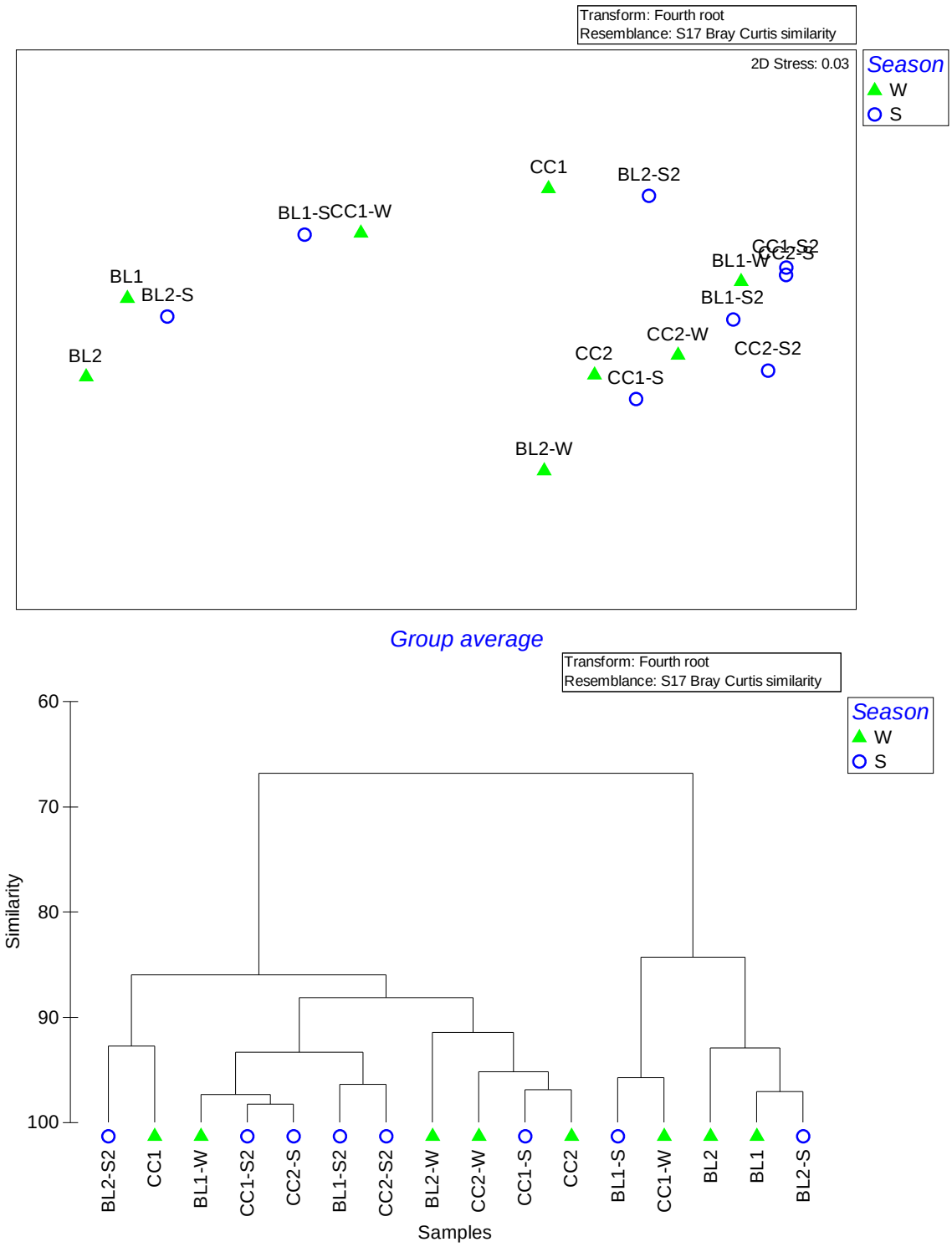
Region B, univariate indirectdeveloper abundance (P =0.0067). Factor: Year (1 and 2) –



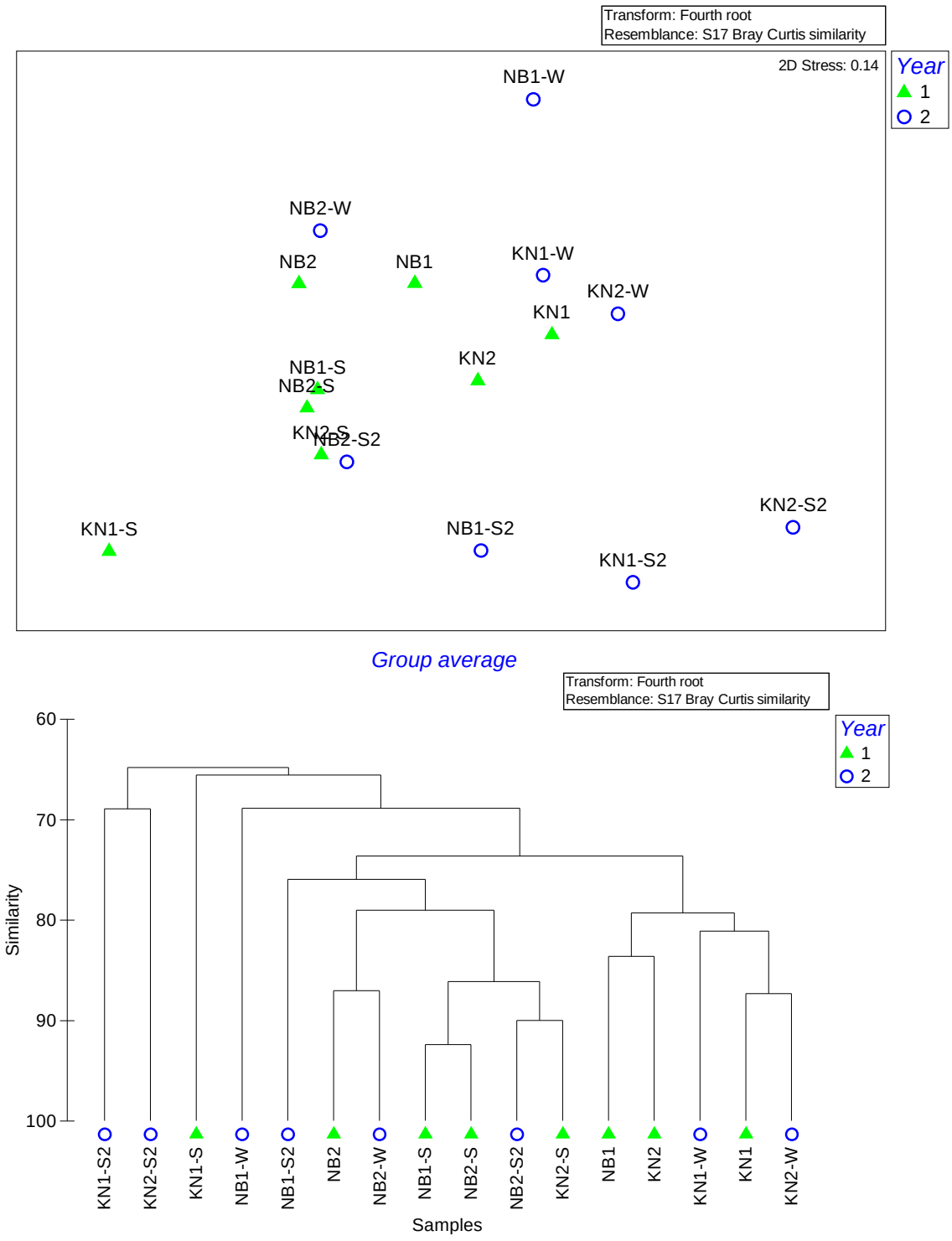
Region B, species biomass (P = 0.0147). Factor: Season (winter [W] and summer [S]).



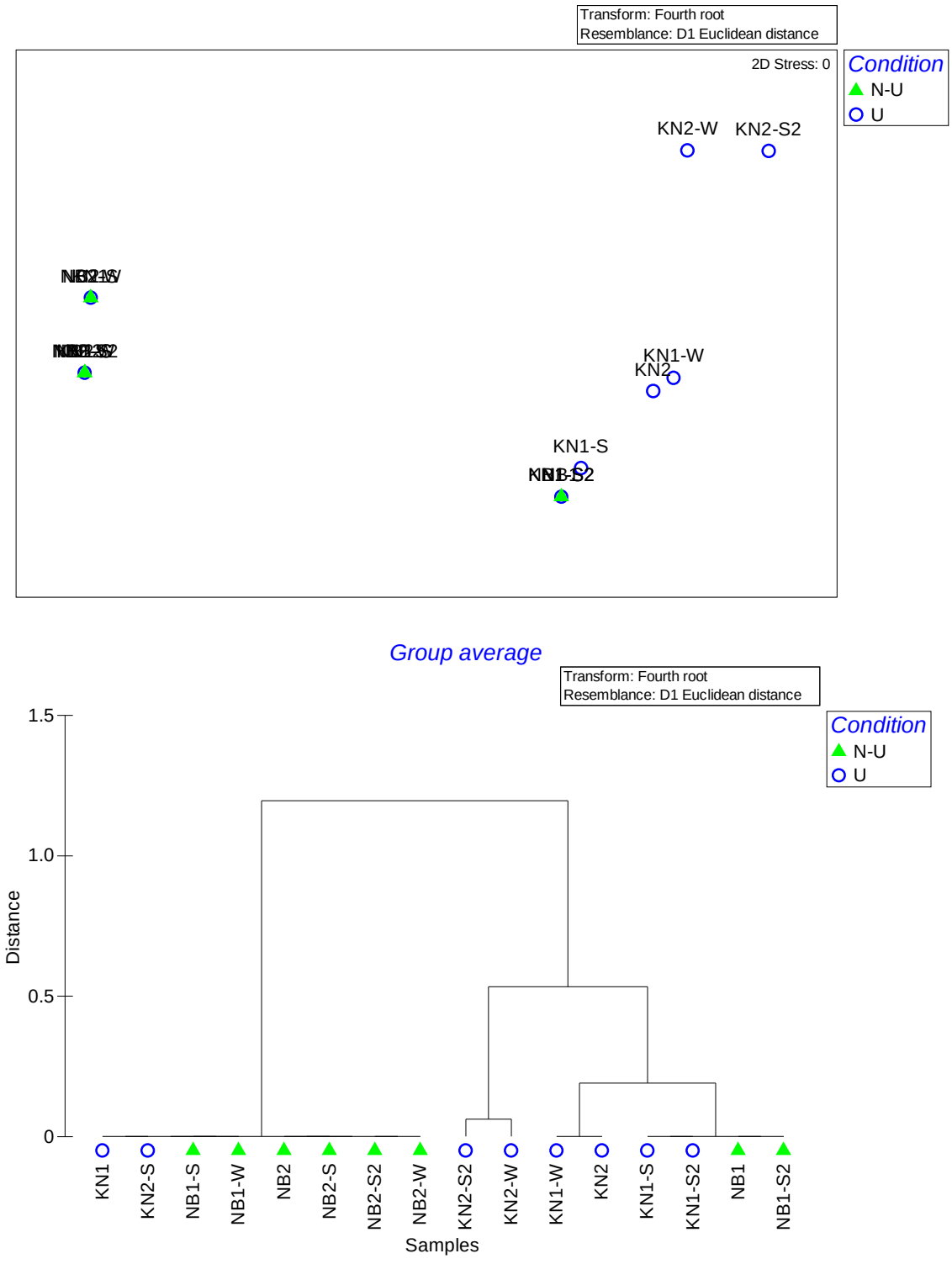
Region B, univariate filter feeder biomass (P = 0.0499). Factor: Season (winter [W] and summer [S]).



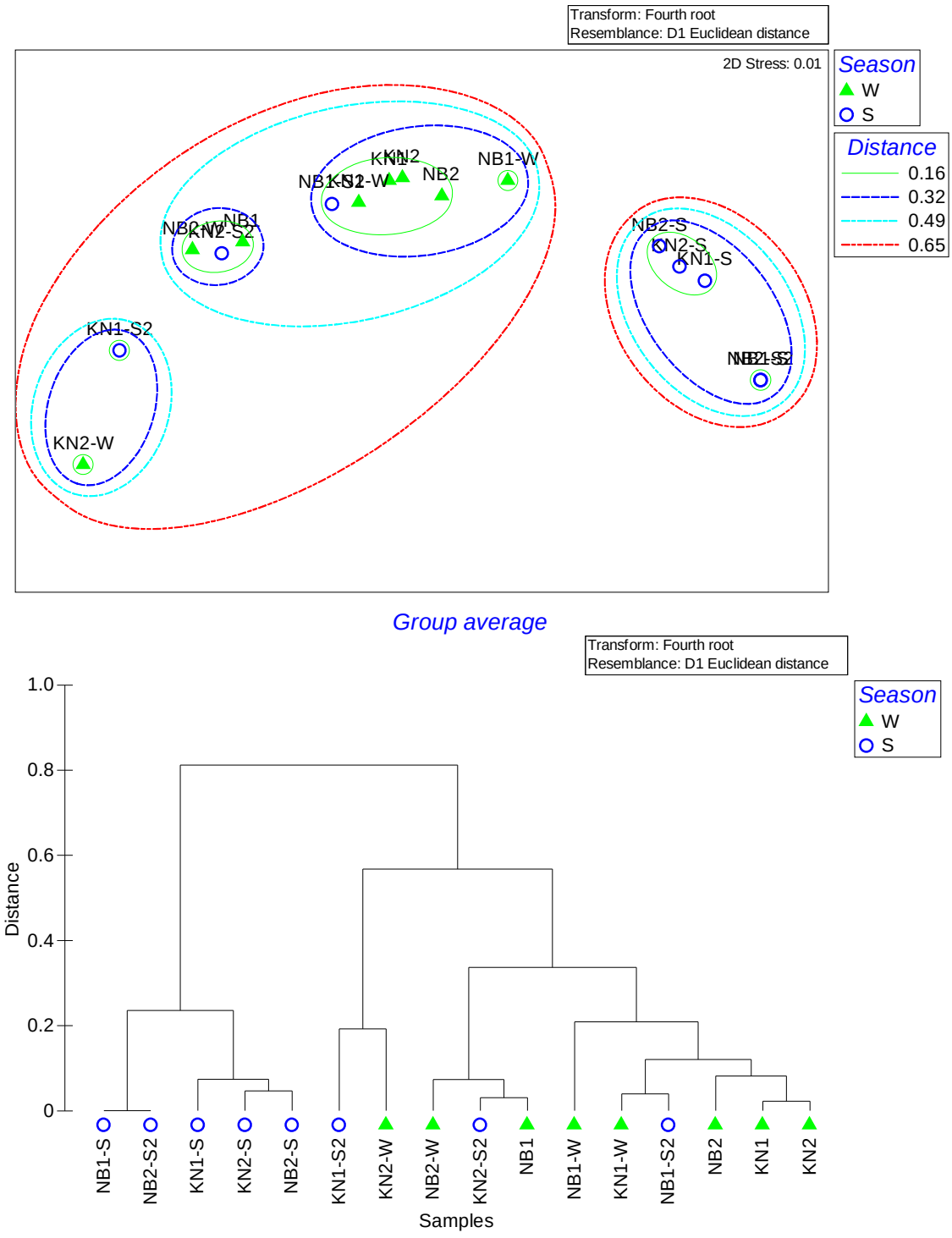
Region B, both reproductive modes biomass (P = 0.0449). Factor: Season (winter [W] and summer [S]).



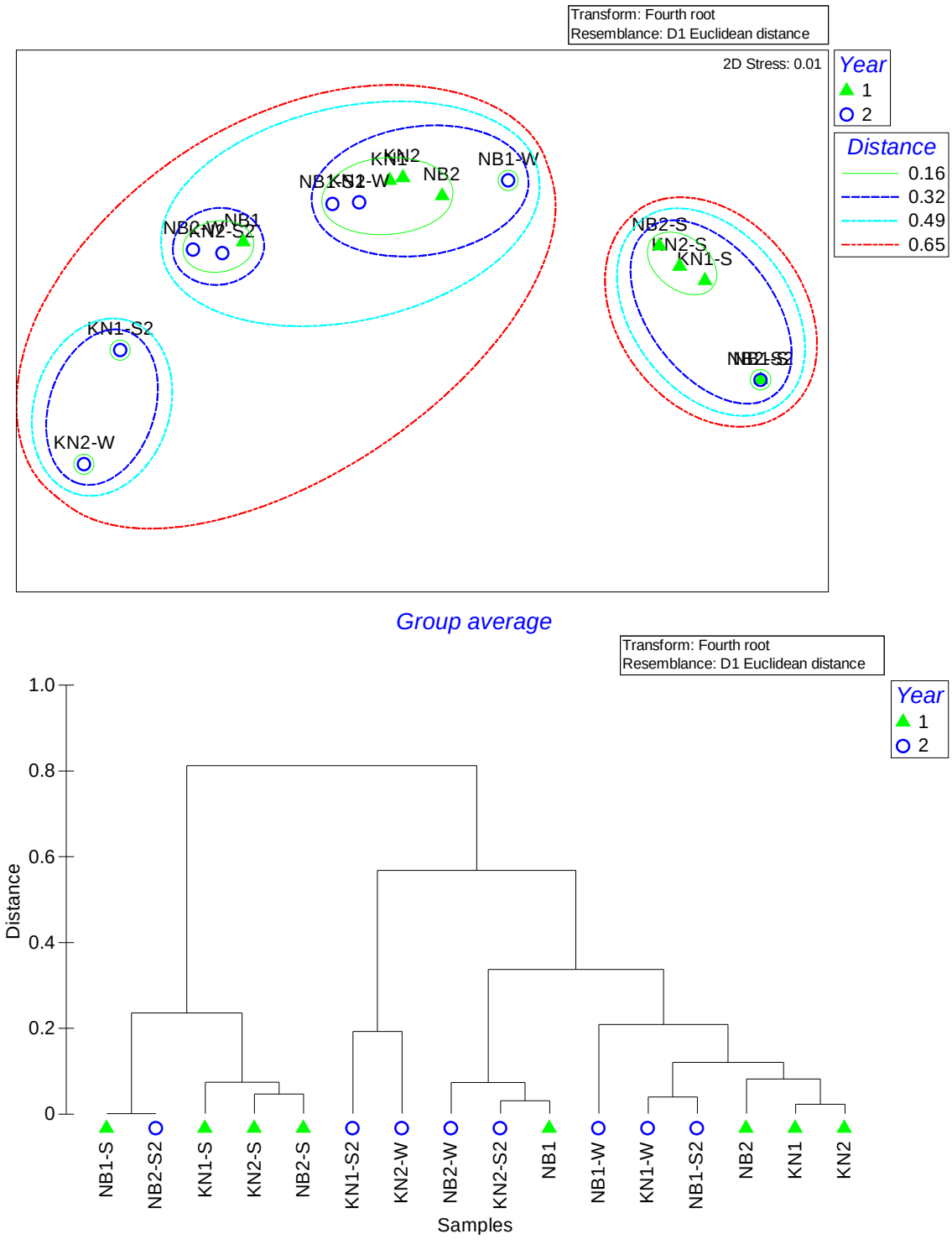
Region C, species abundance (P = 0.0297). Factor: Year (1 and 2)



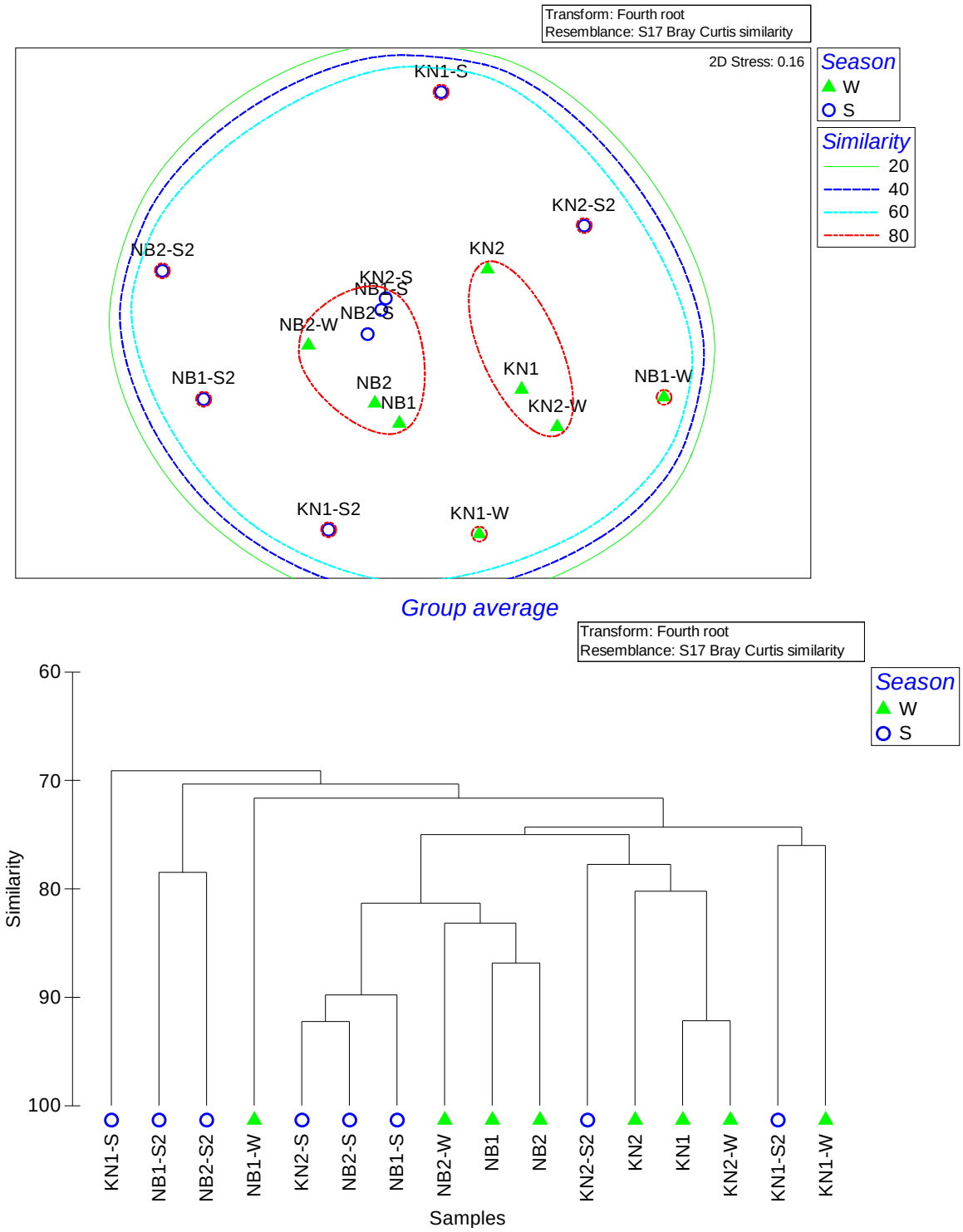
Region C, univariate deposit feeder abundance (P = 0.0387). Factor: Condition (upwelling [U] and non-upwelling [N-U]). .



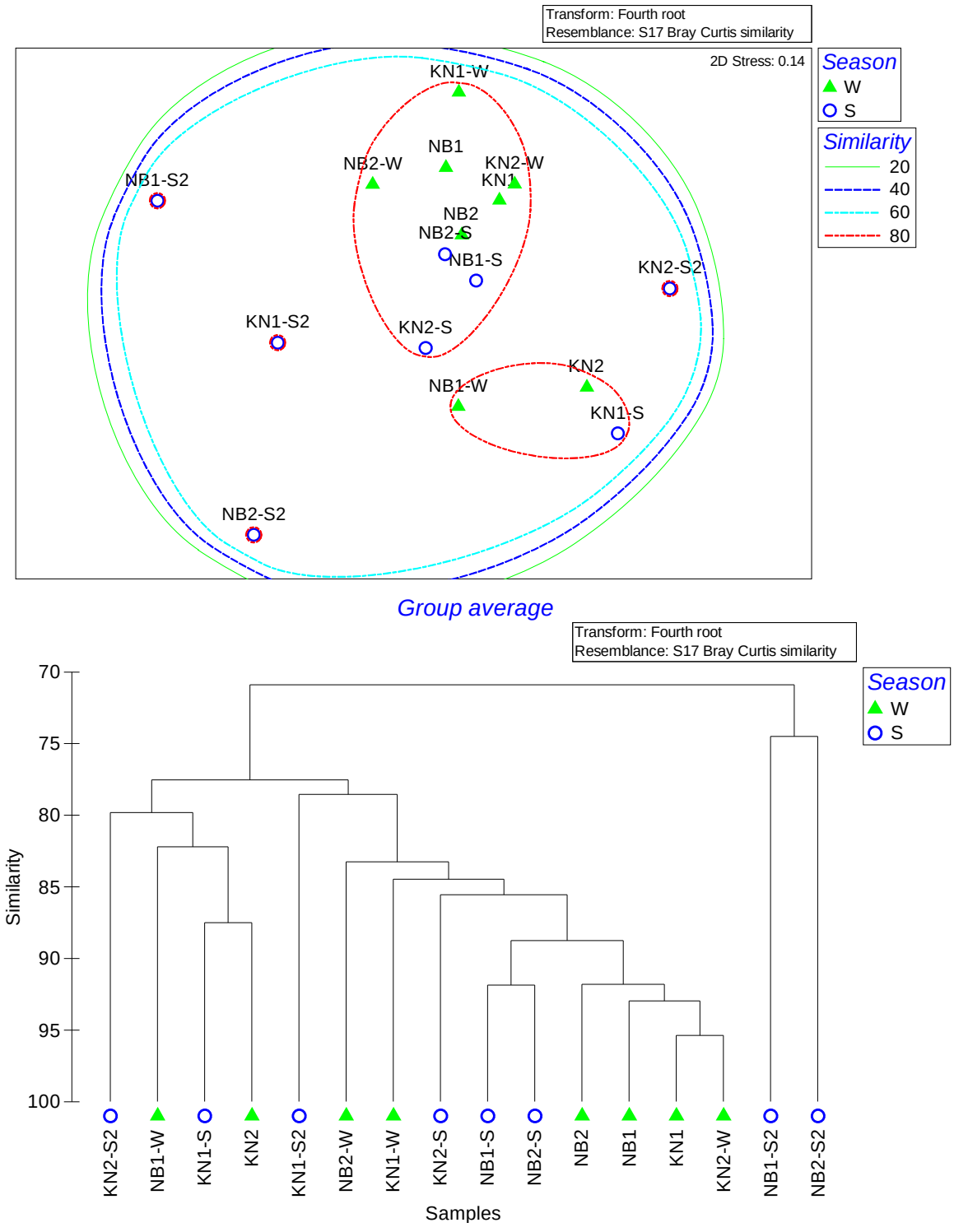
Region C, univariate direct developer abundance (P = 0.0409). Factor: Season (winter [W] and summer [S]).



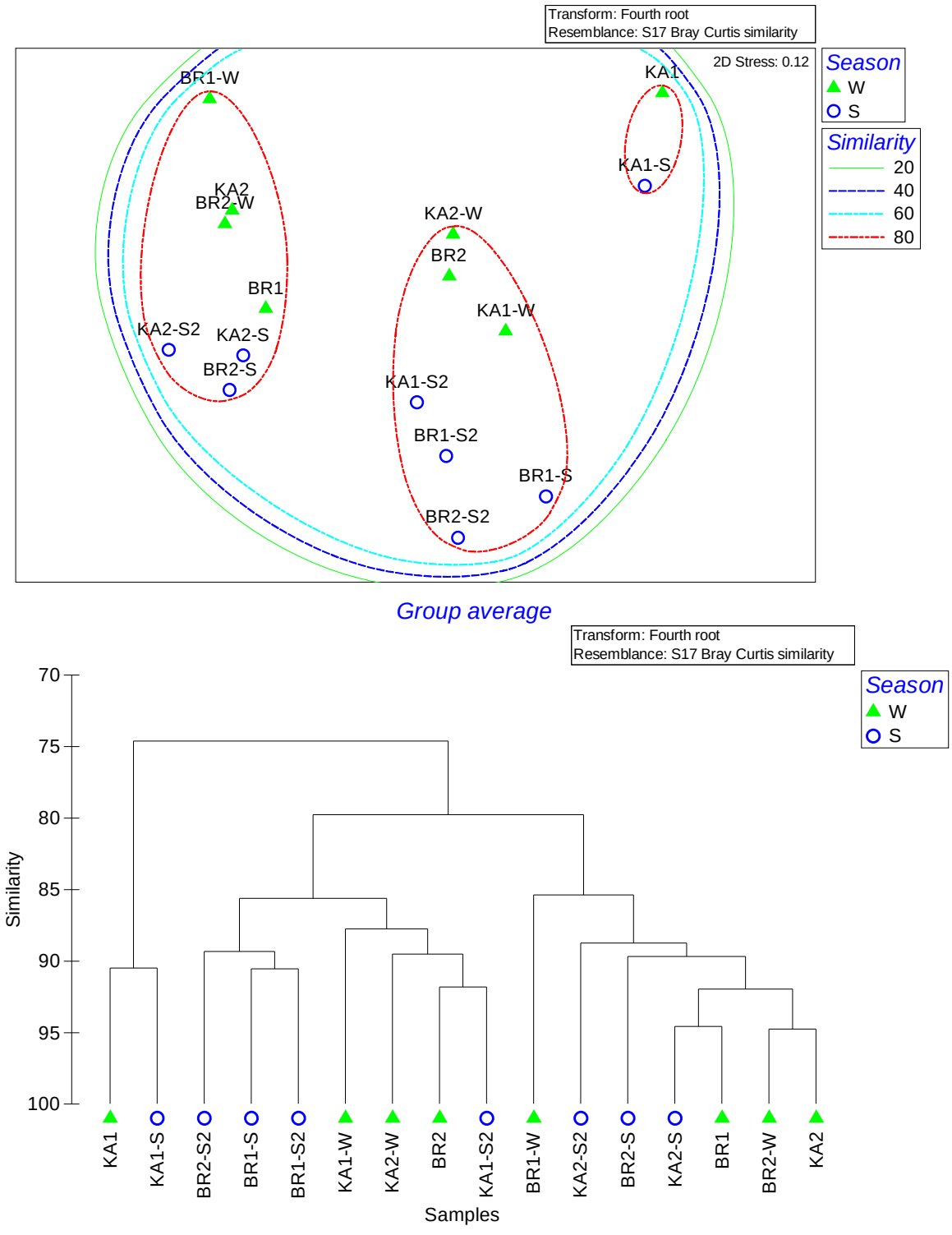
Region C, univariate direct developer abundance (P = 0.0421). Factor: Year (1 and 2).



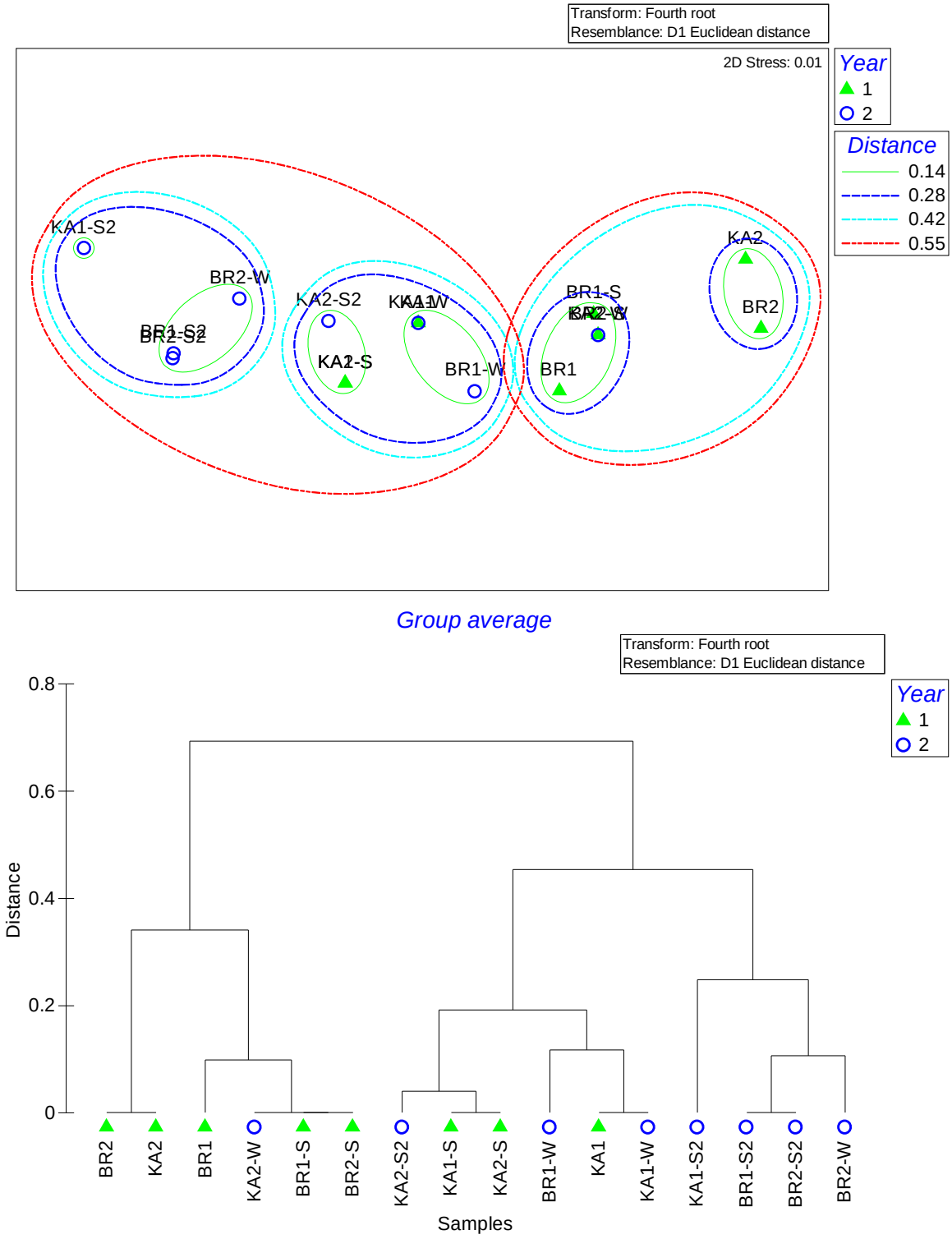
Region C, species biomass (P = 0.0095). Factor: Season (winter[W] and summer [S]).



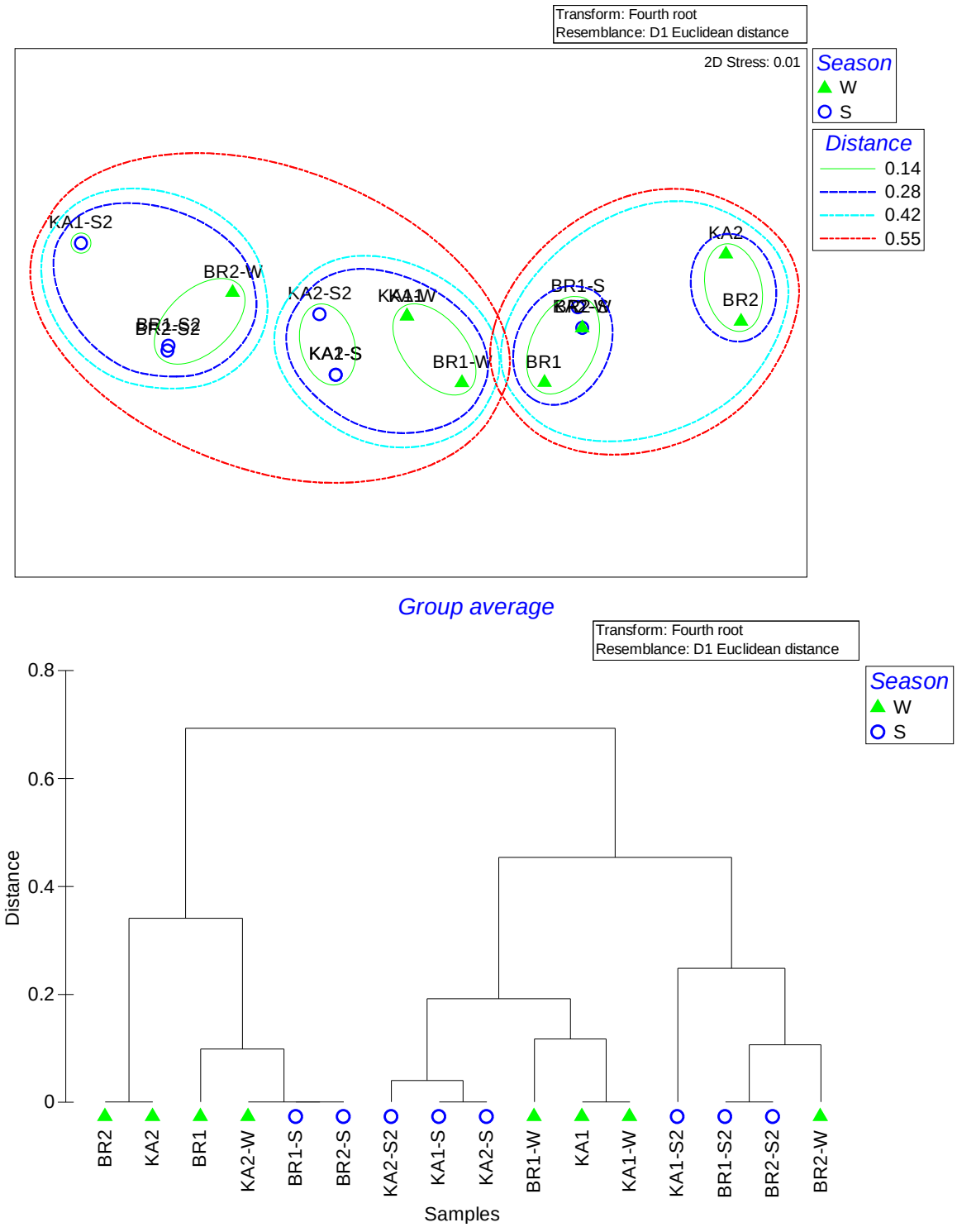
Region C, order biomass (P = 0.0195). Factor: Season (winter [W] and summer [S]).



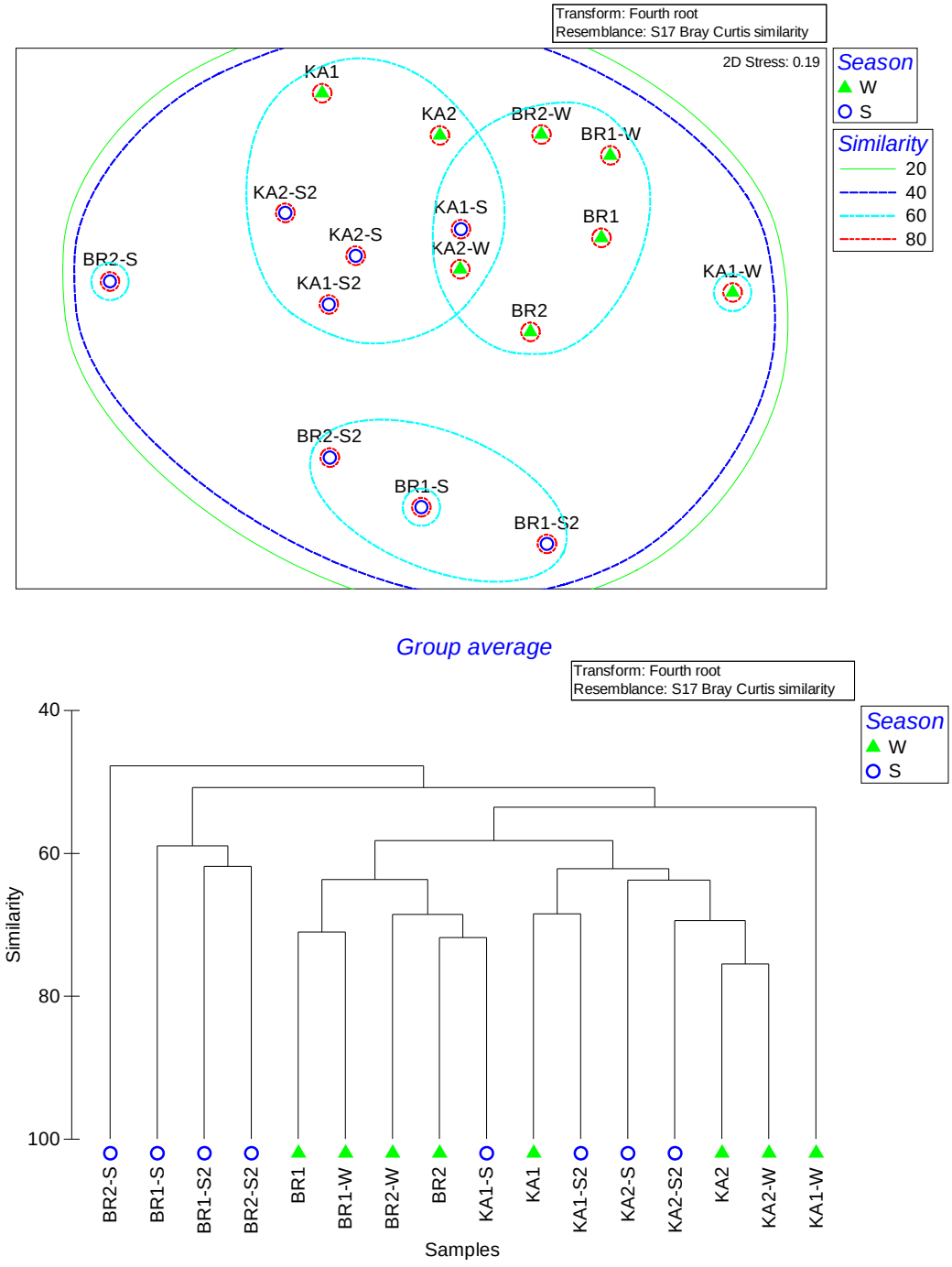
Region D, phyla abundance (P = 0.0047). Factor: Season (winter [W] and summer [S]



Region D, filter feeder abundance (P = 0.0098). Factor: Year (1 and 2).

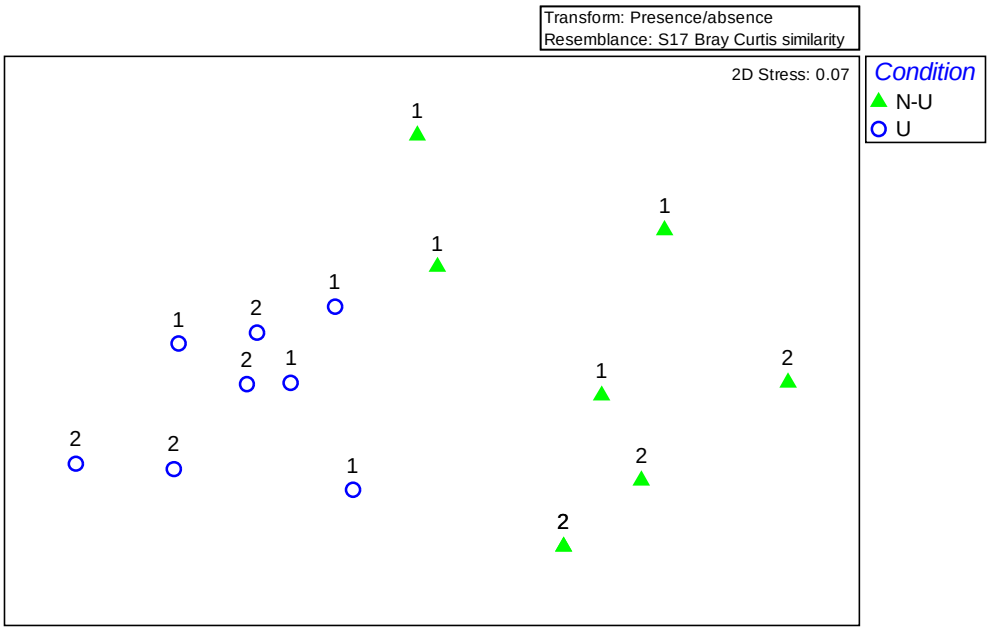


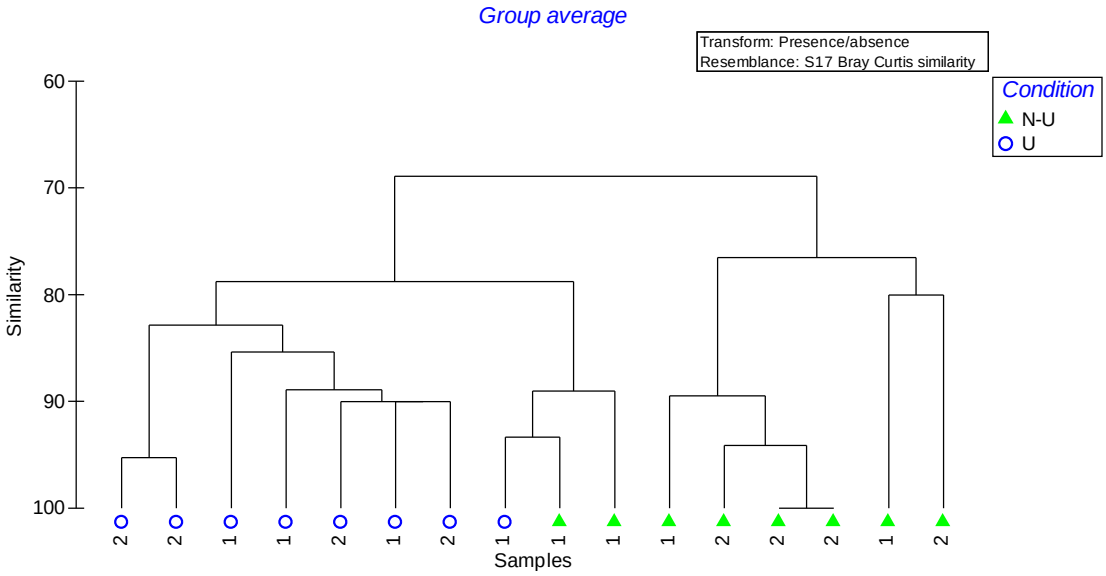
Region D, Filter feeder biomass (P = 0.0266). Factor: Season (winter[W] and summer [S]).



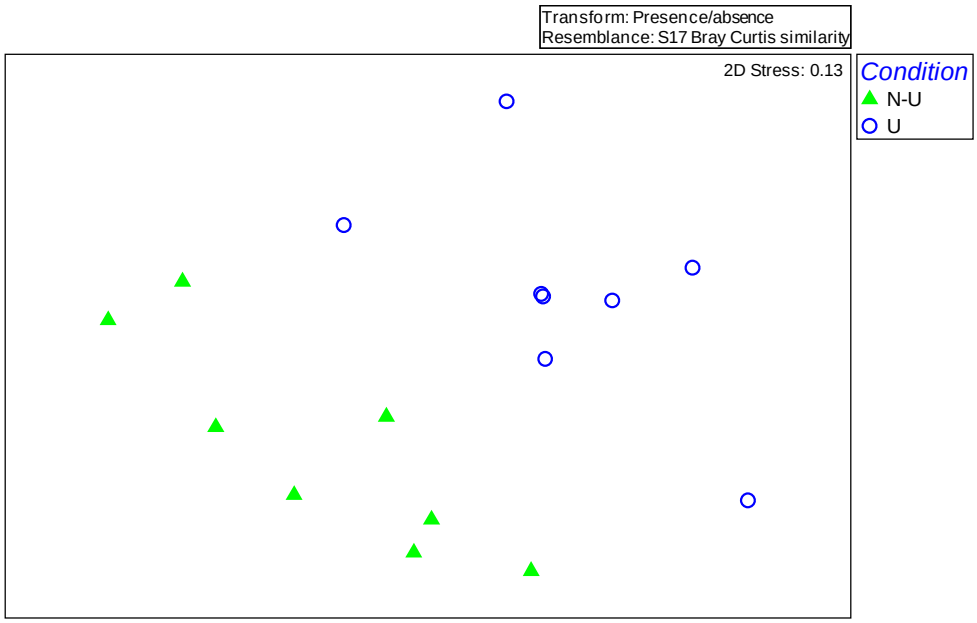
Region D, species biomass (P = 0.0085). Factor: Season (winter [W] and summer [S]).

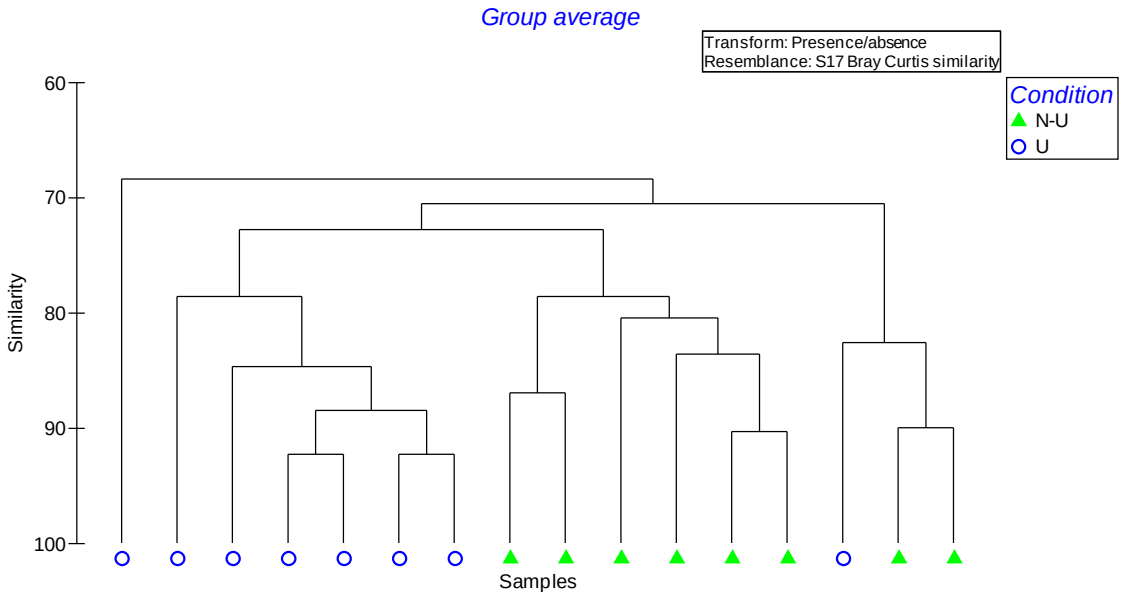
nMDS and CLUSTER plots for significant effects, as present in the thesis.



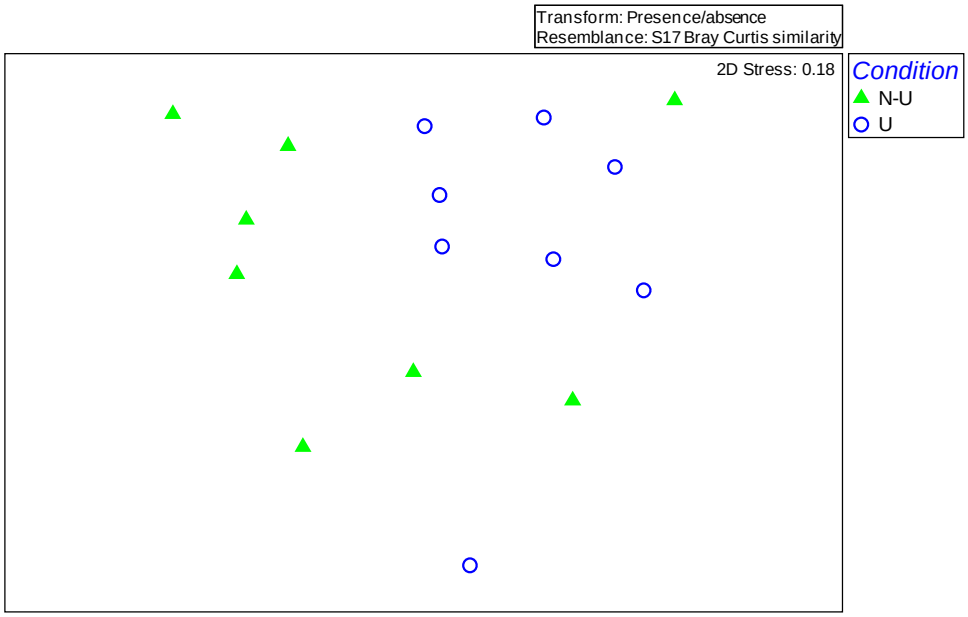


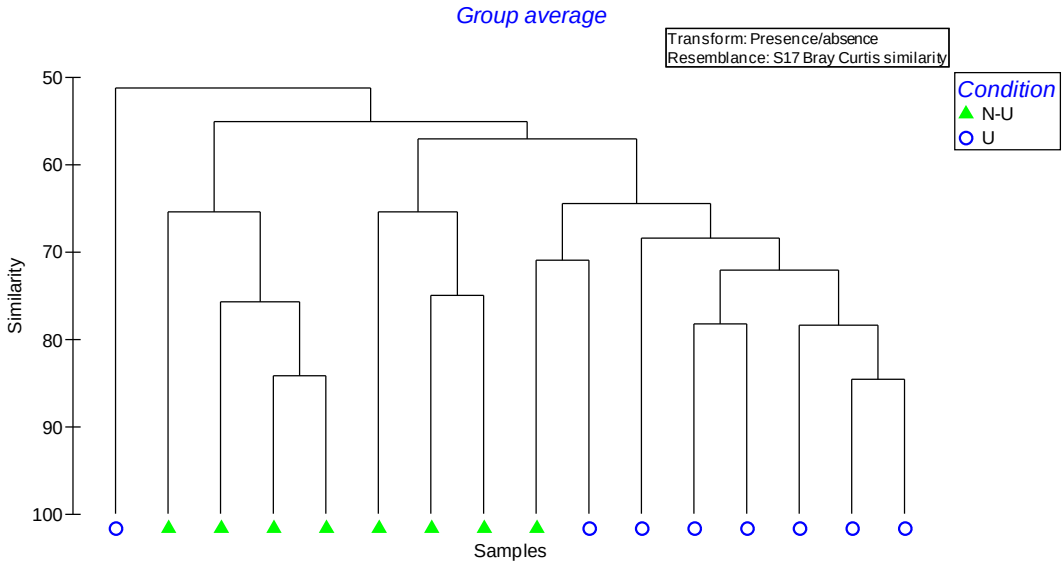
Region A presence/ absence U≠NU in Y1; U≠NU in Y2



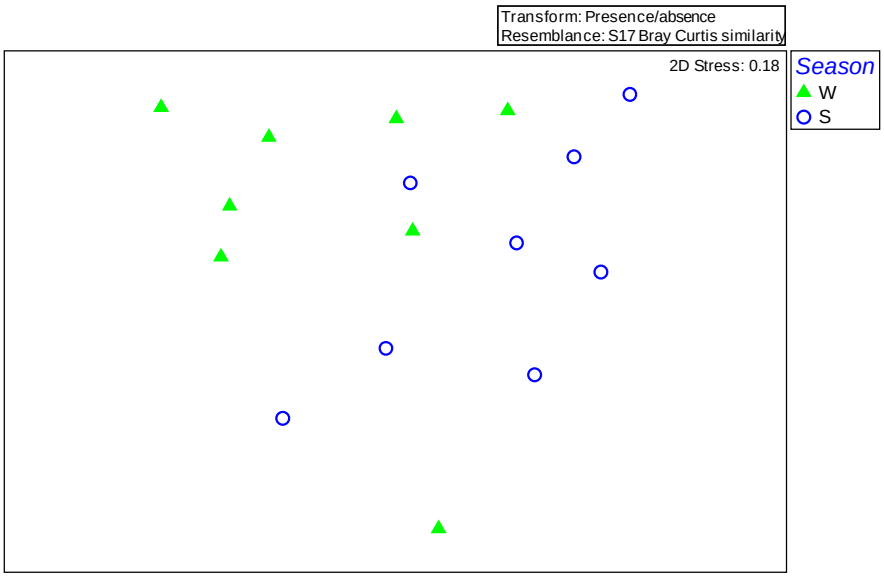


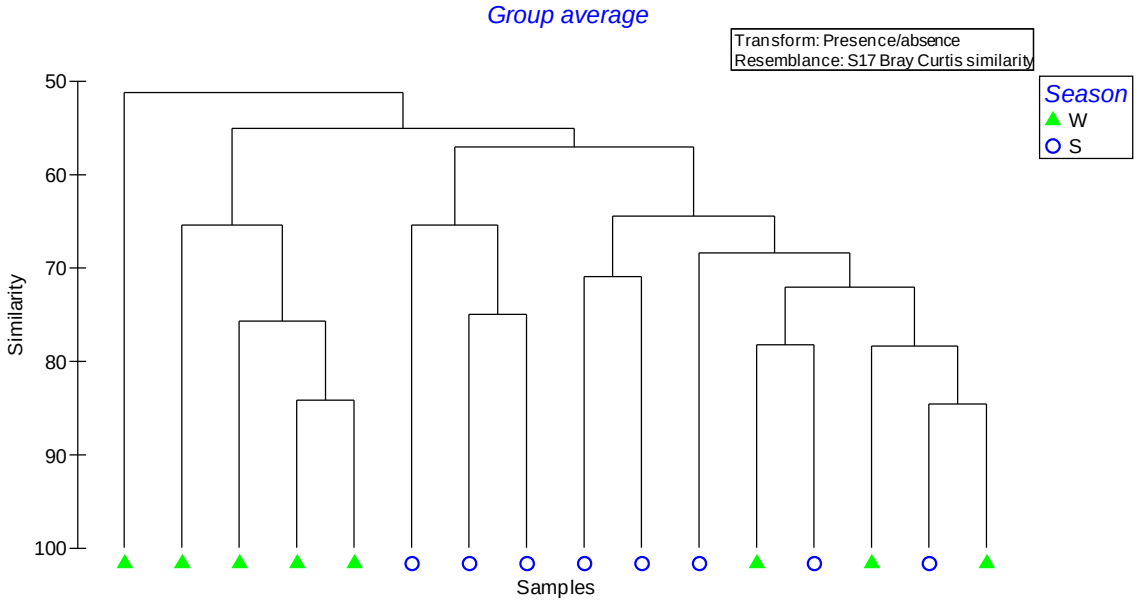
Region B presence/absence, Condition.



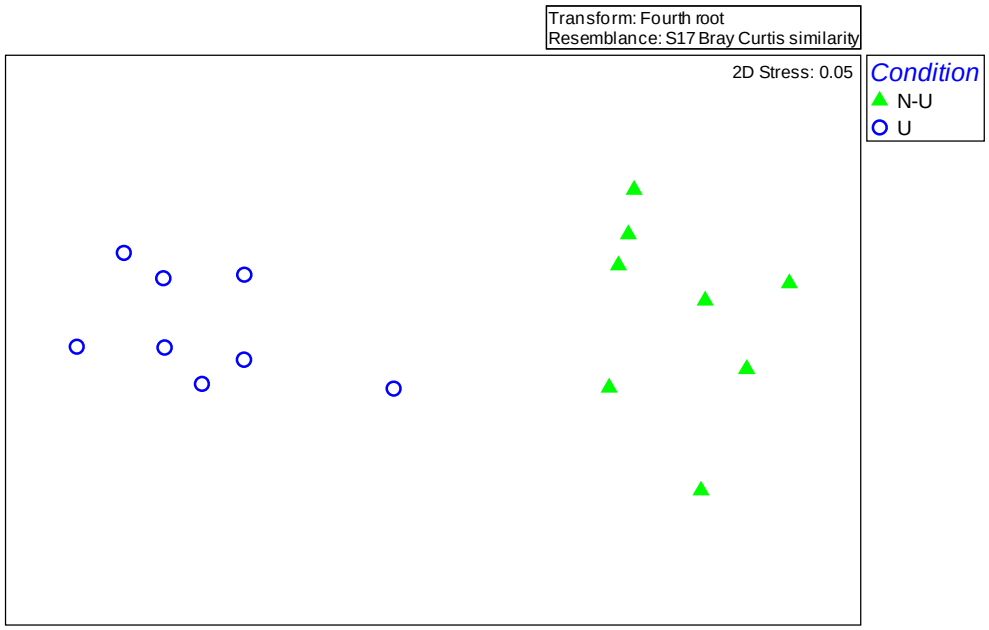


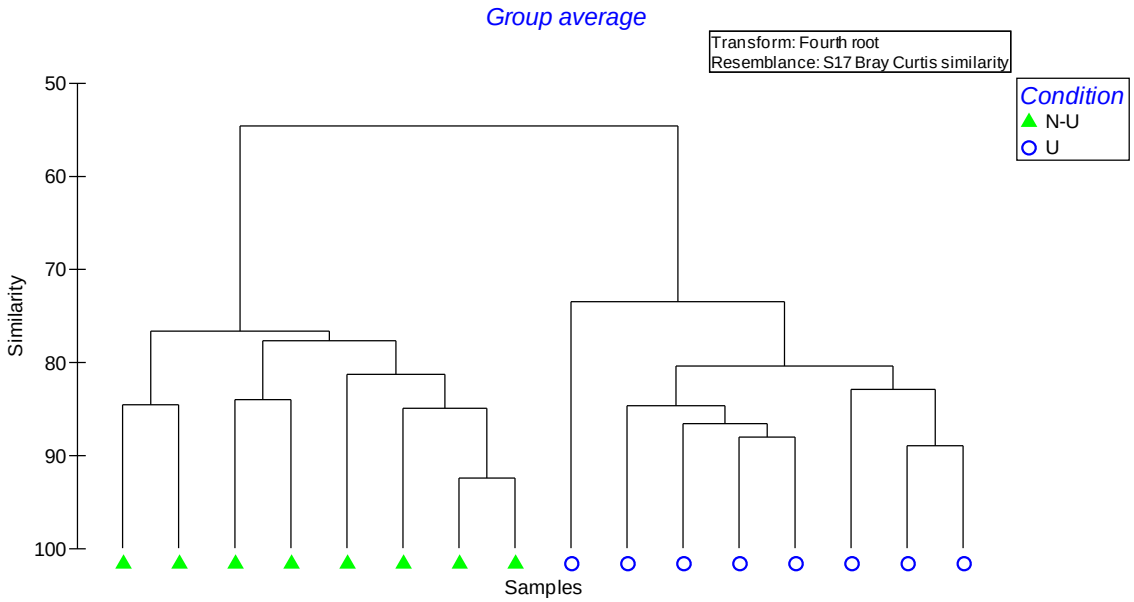
Region D presence/ absence, Condition.



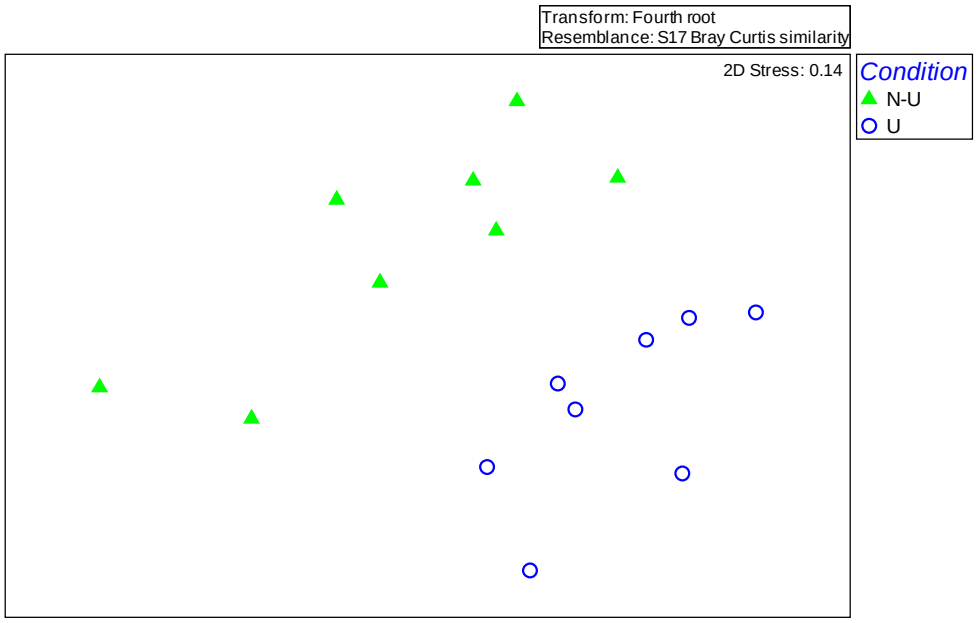


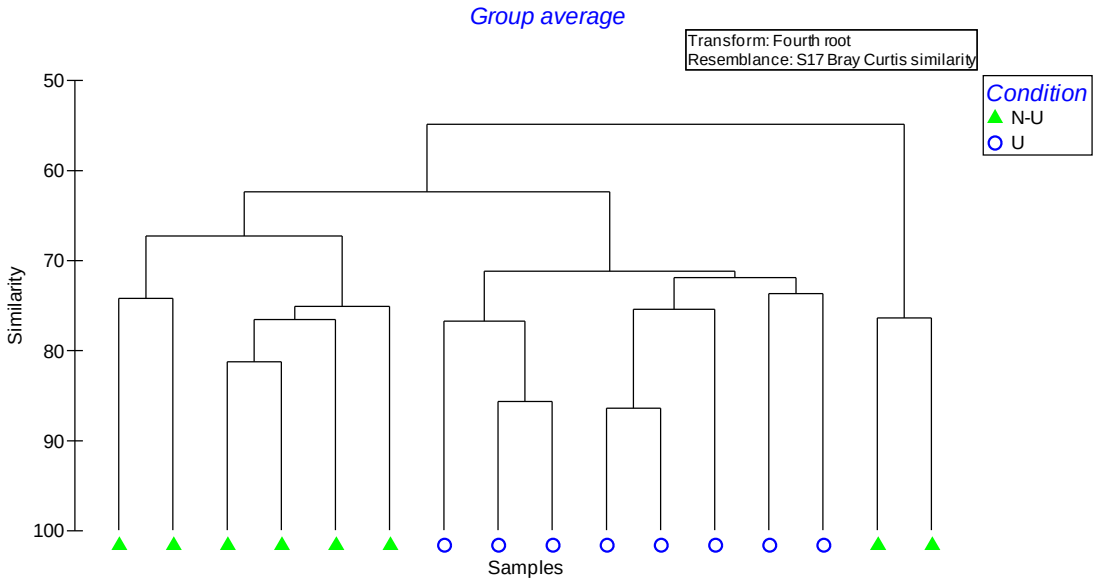
Region D presence/ absence, Season.



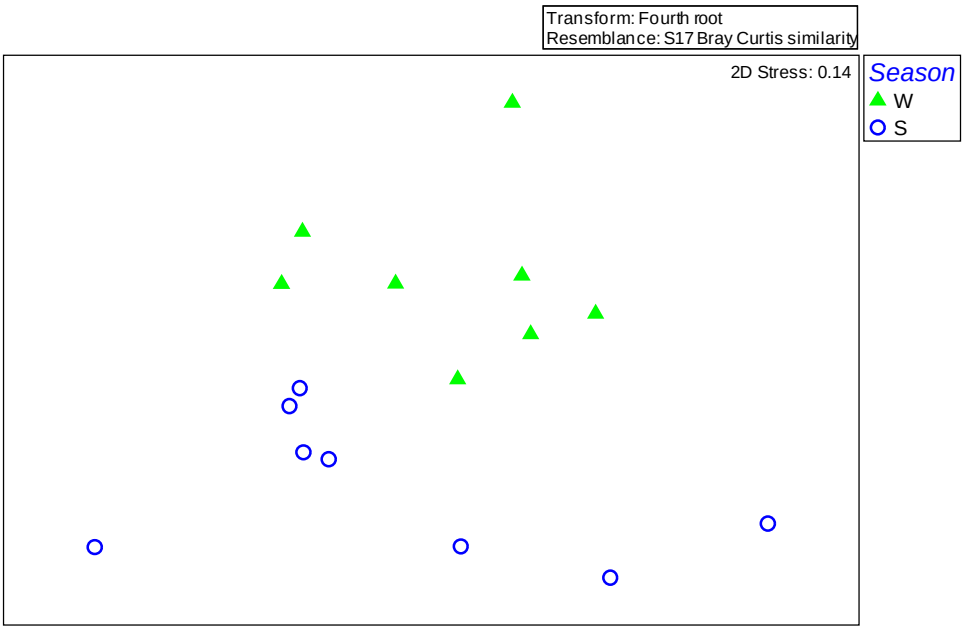


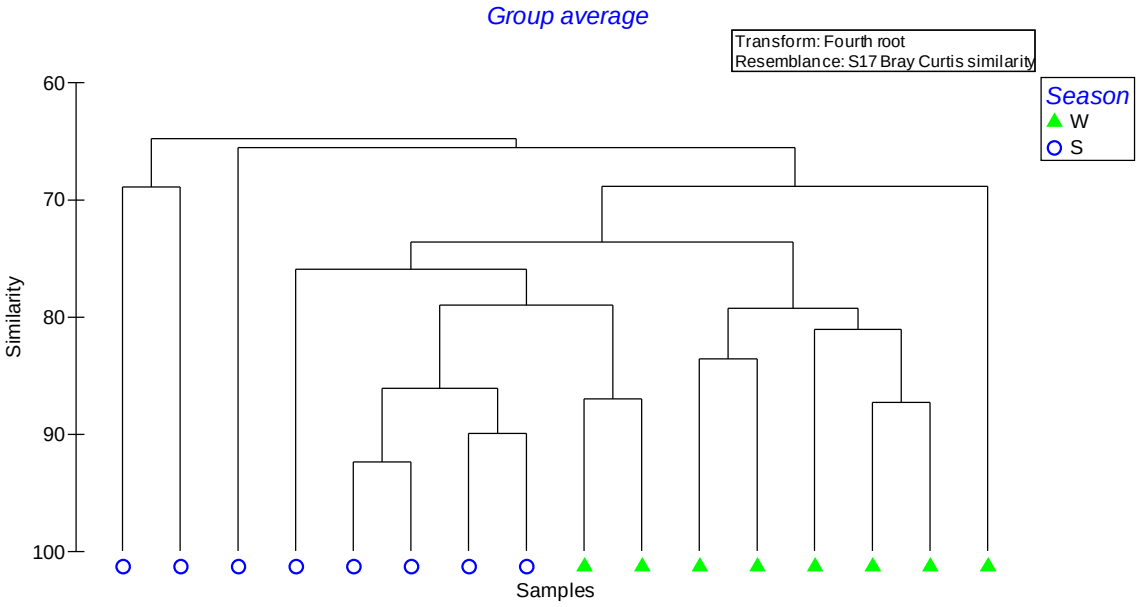
Region A species abundance , Condition.



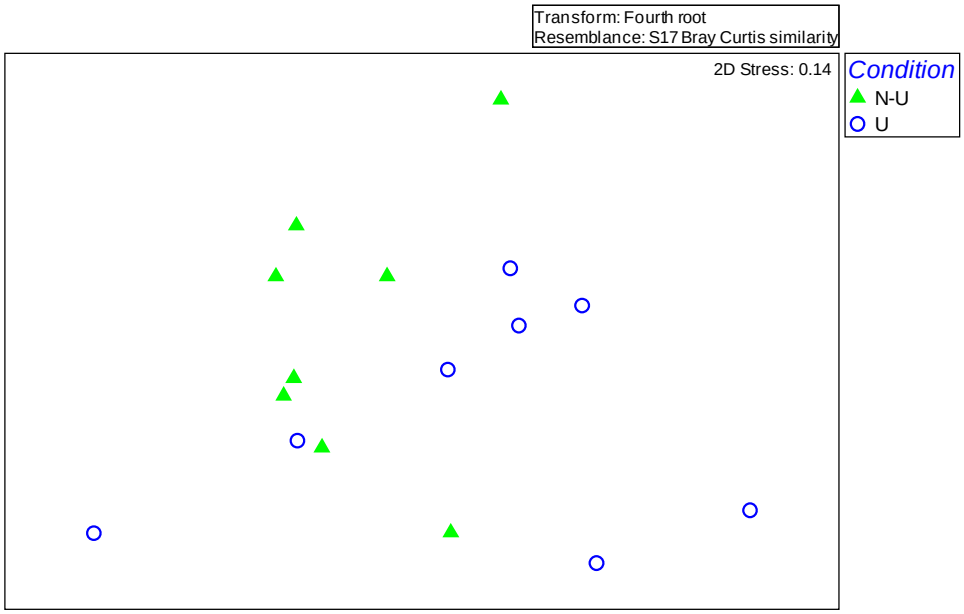


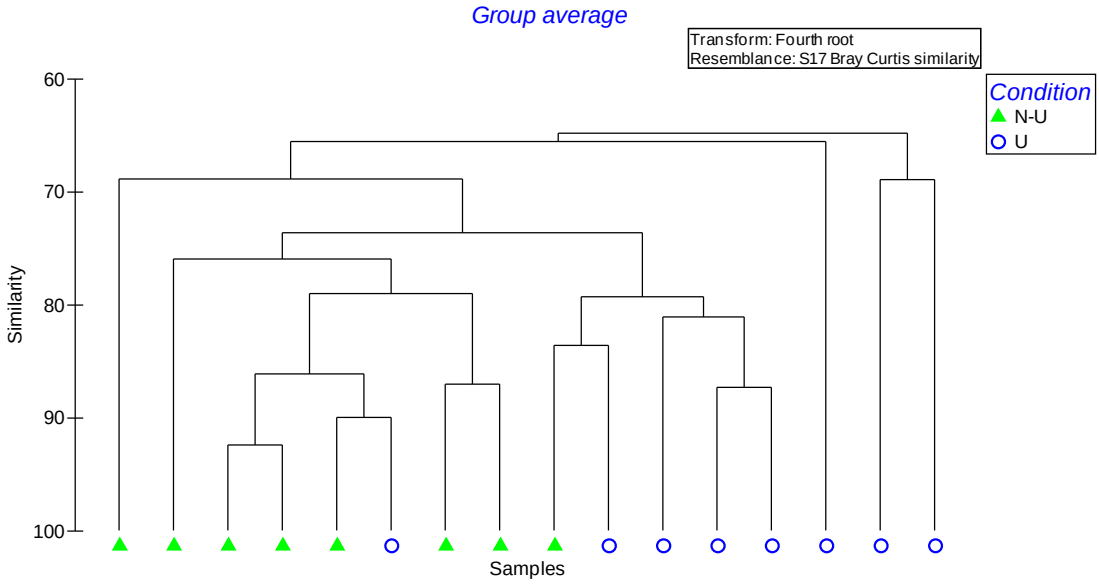
Region B species abundance, Condition.



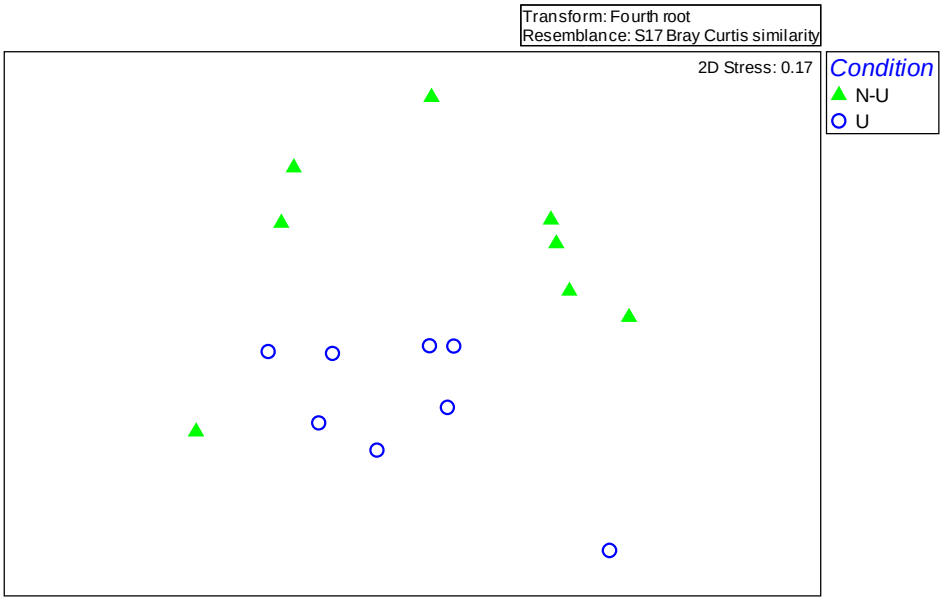


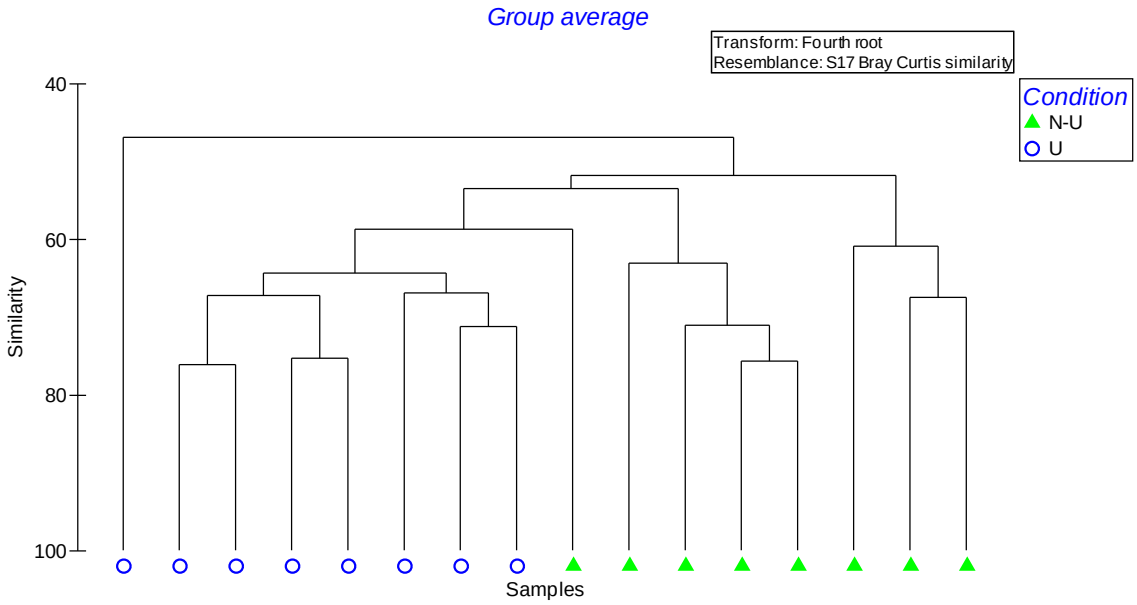
Region C species abundance, Season.



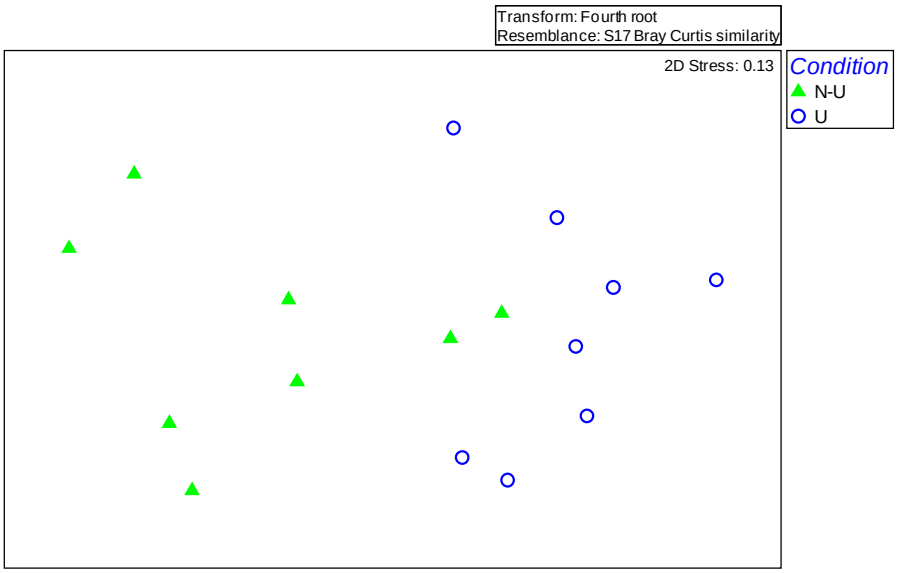


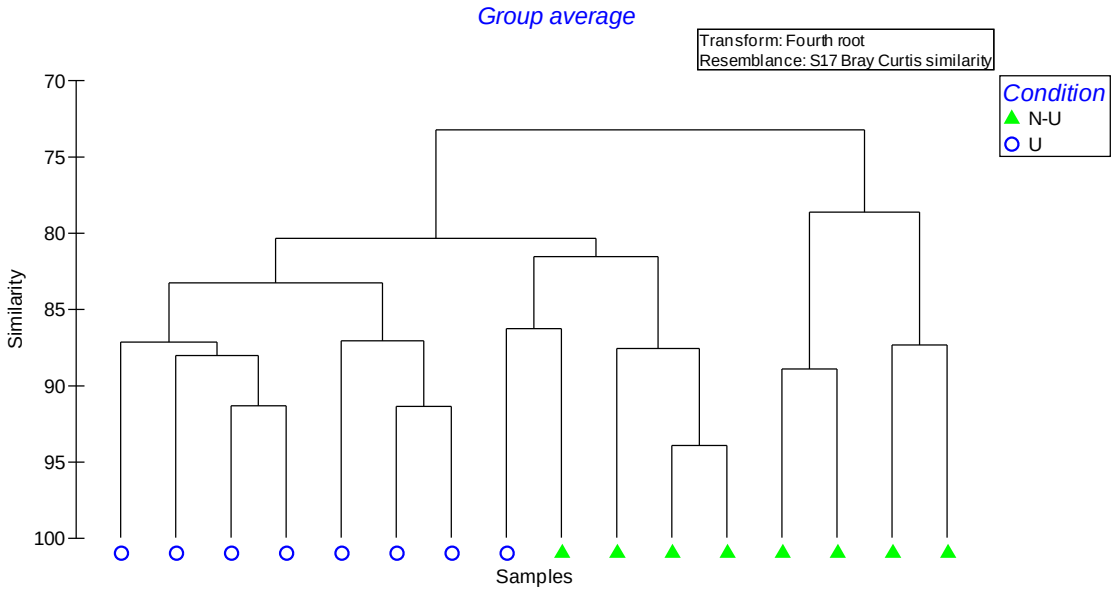
Region C species abundance, Condition.



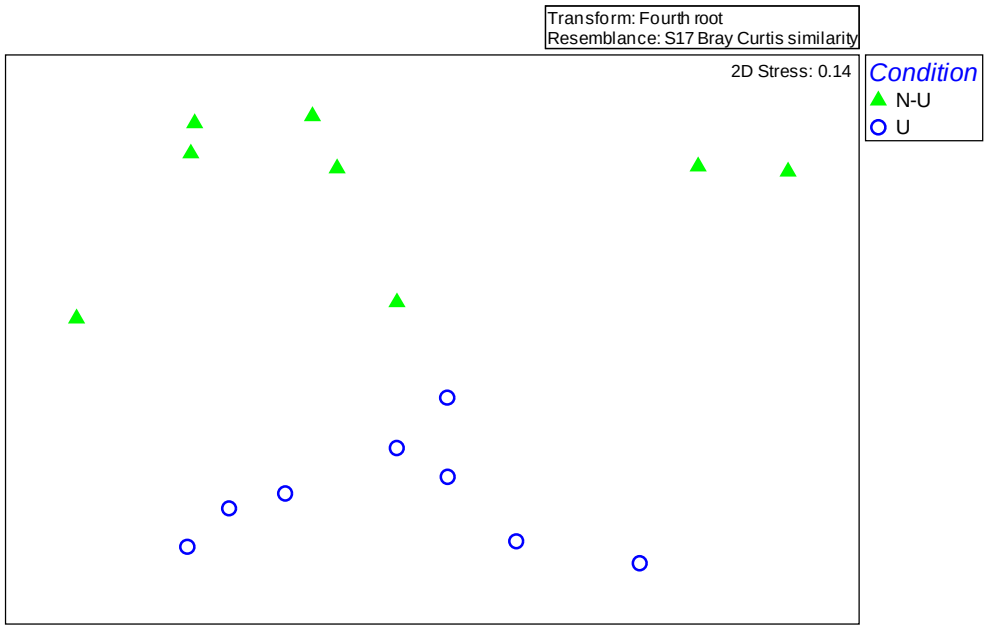


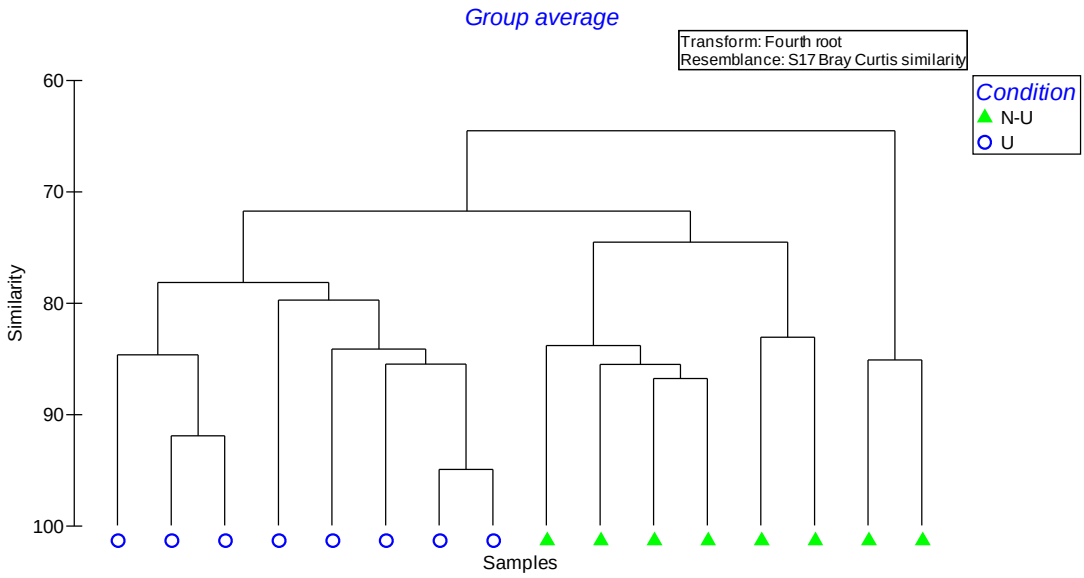
Region D species abundance, Condition.



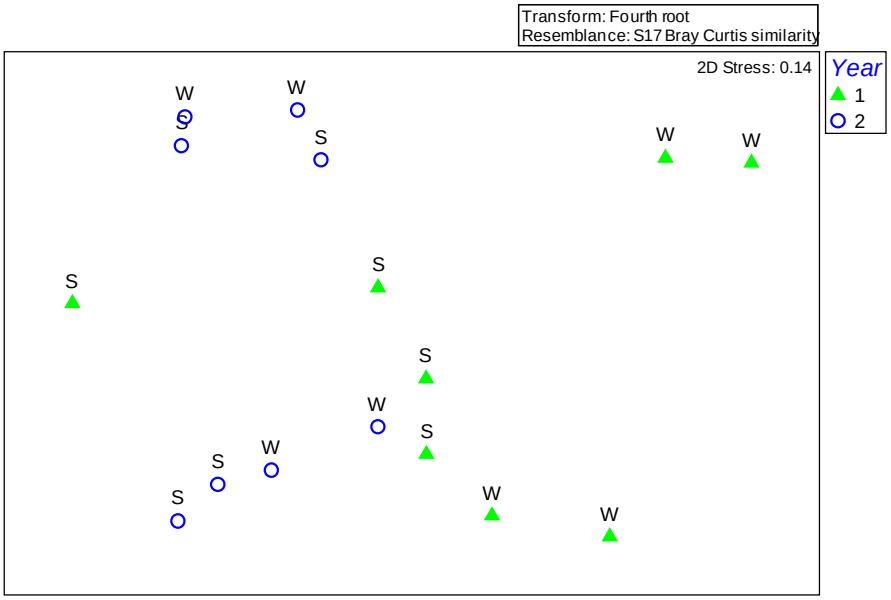


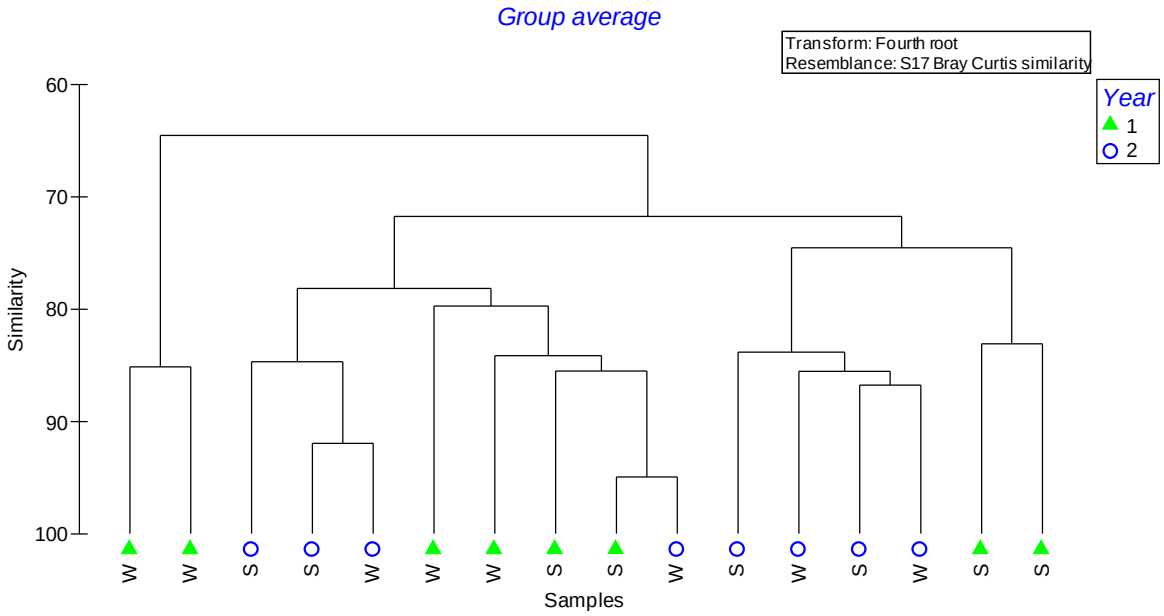
Region A order abundance, Condition.



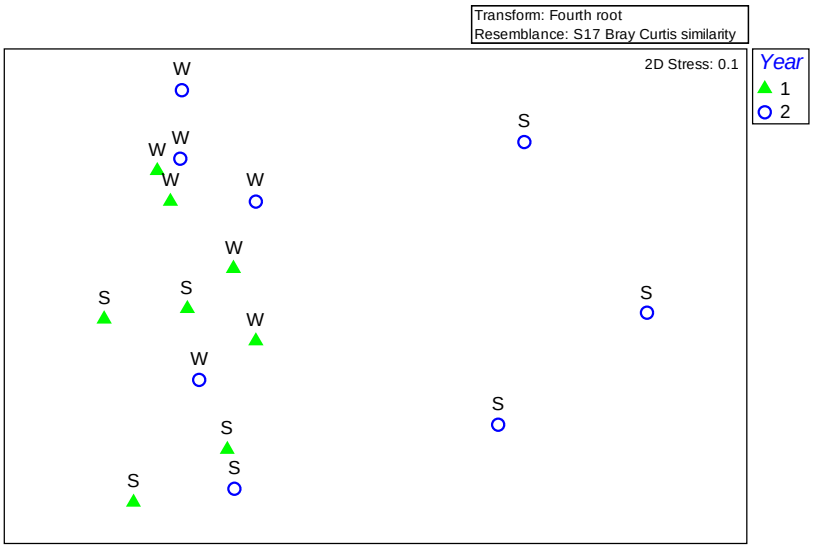


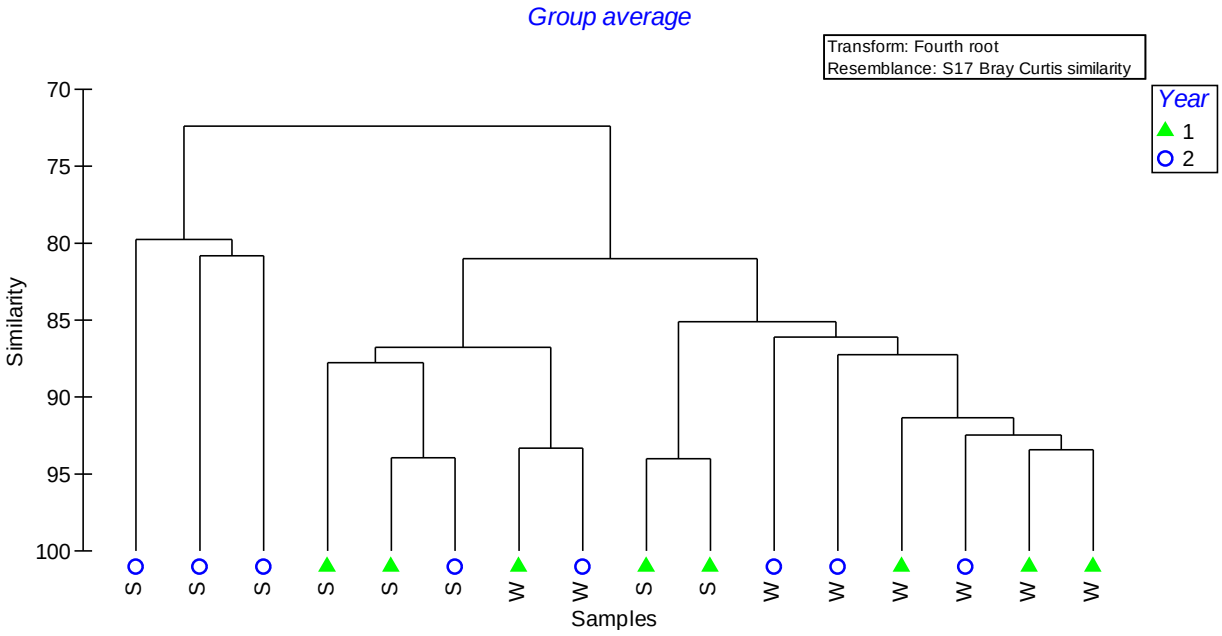
Region B order abundance, Condition.



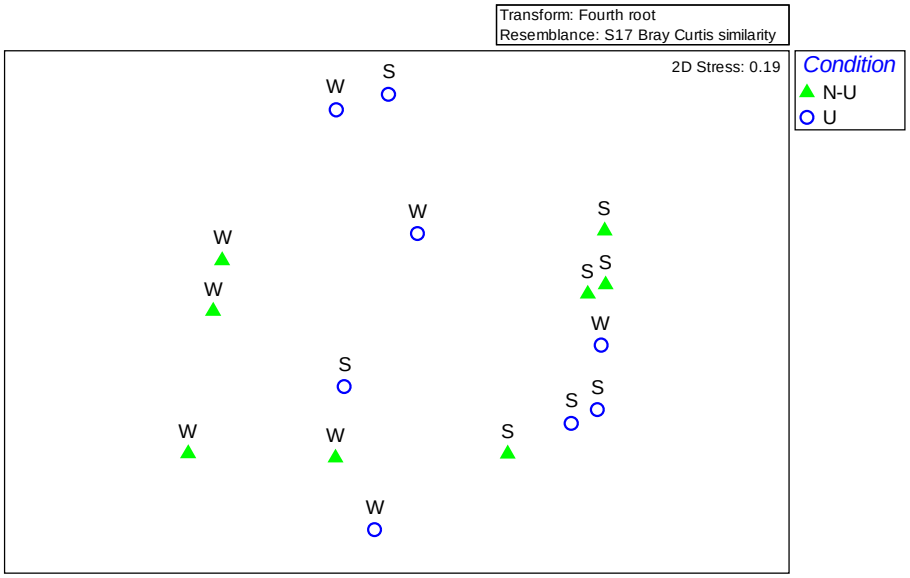


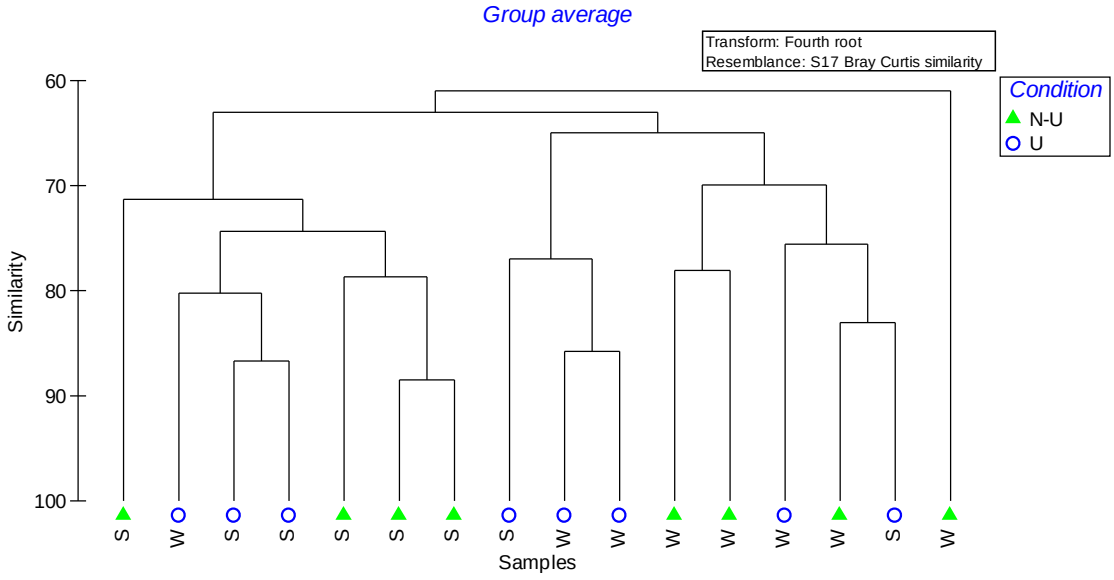
Region B order abundance, W≠S in Y1; Y1≠Y2 in W.



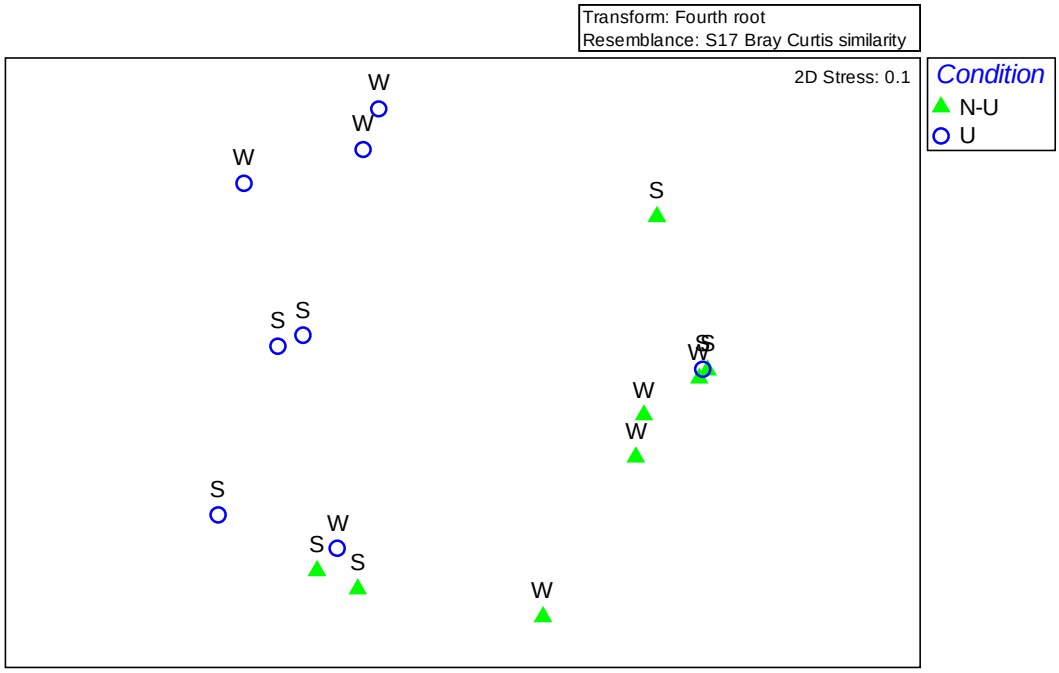


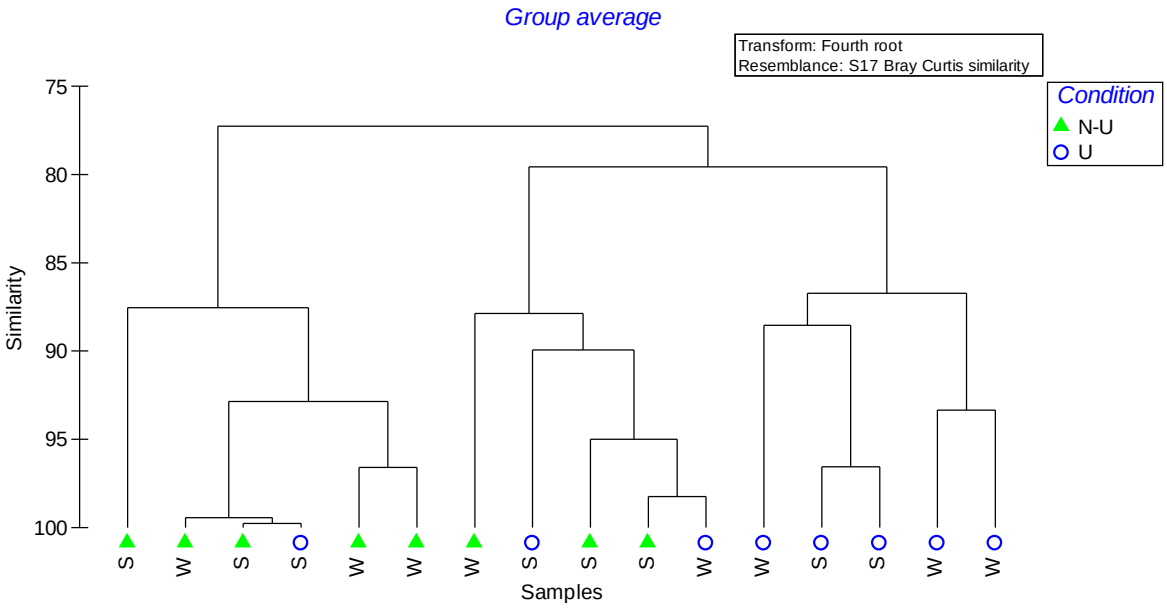
Region C order abundance, W≠S in Y1; W≠S in Y2.



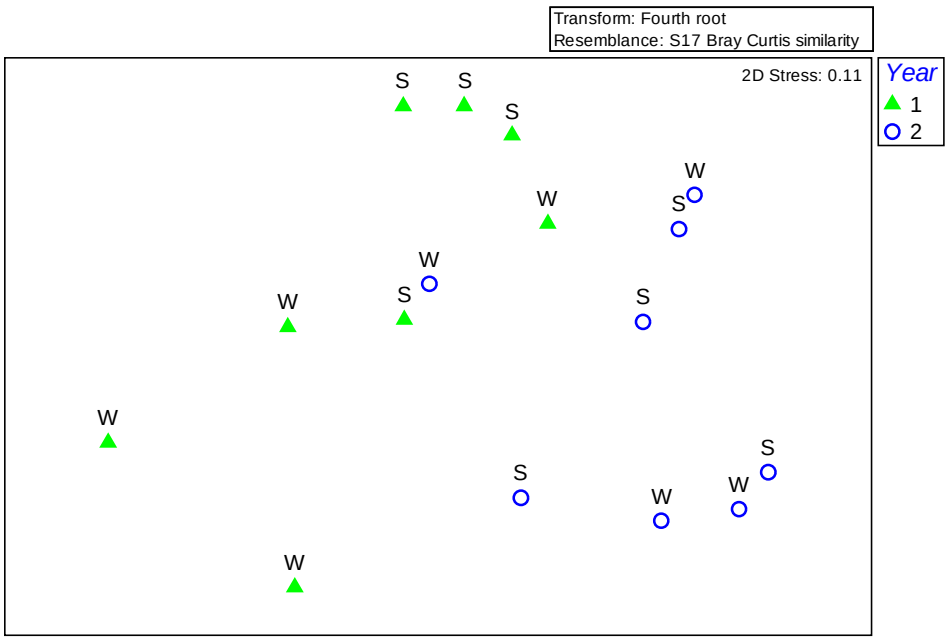


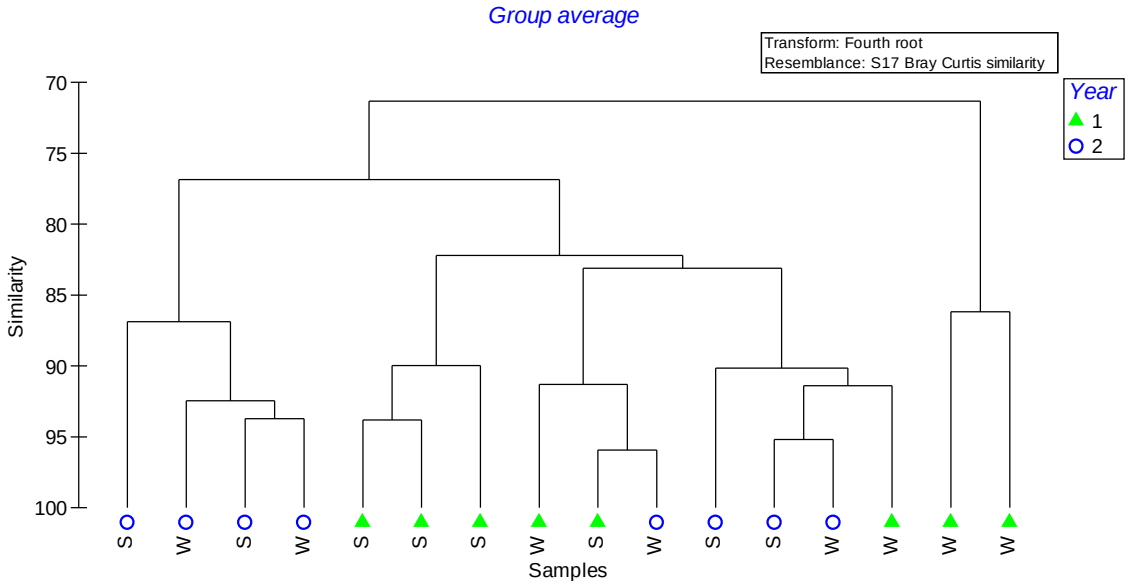
Region D order abundance, W≠S in NU.



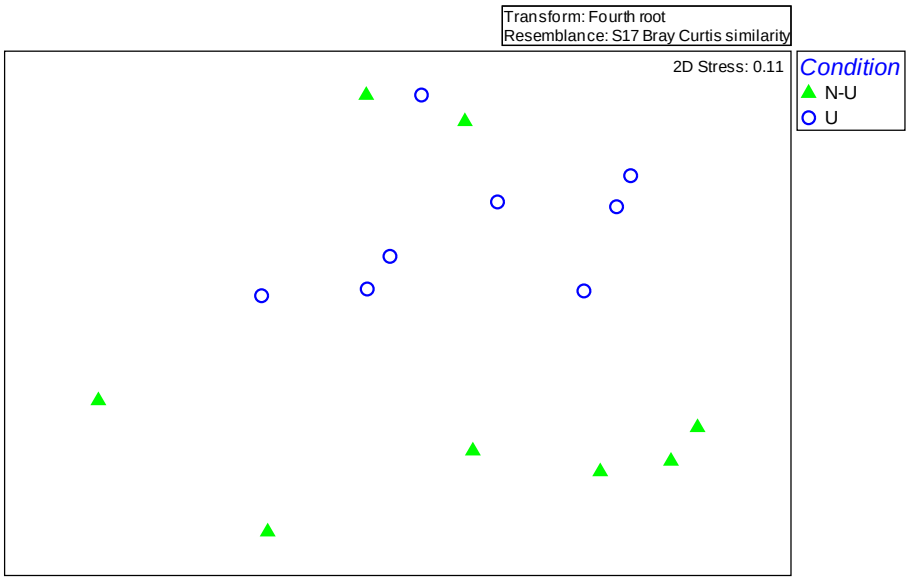


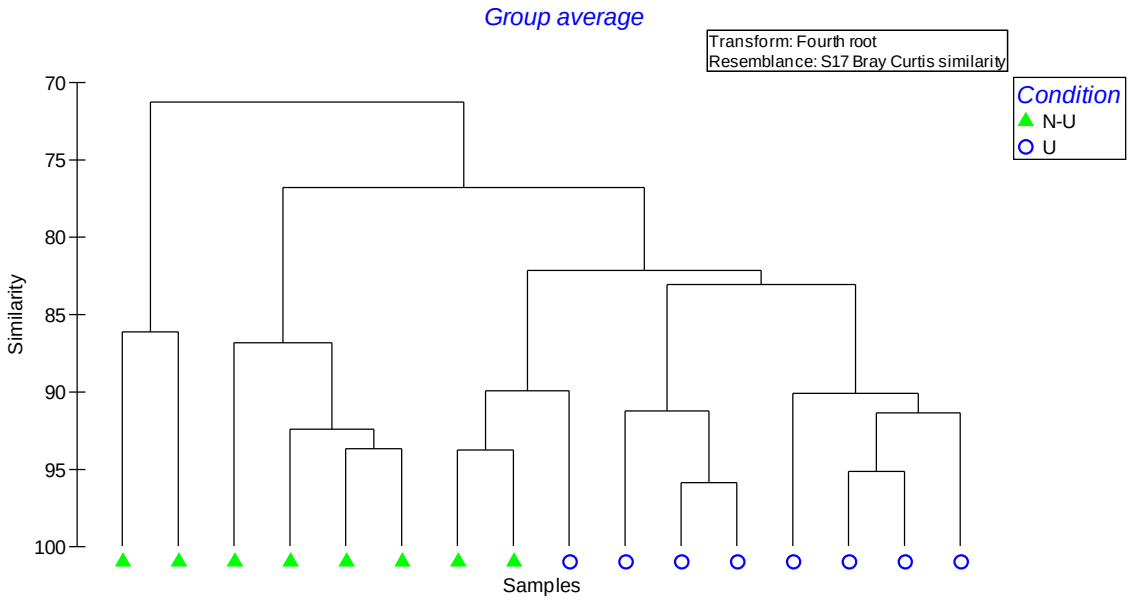
Region A phylum abundance, U≠NU in W.



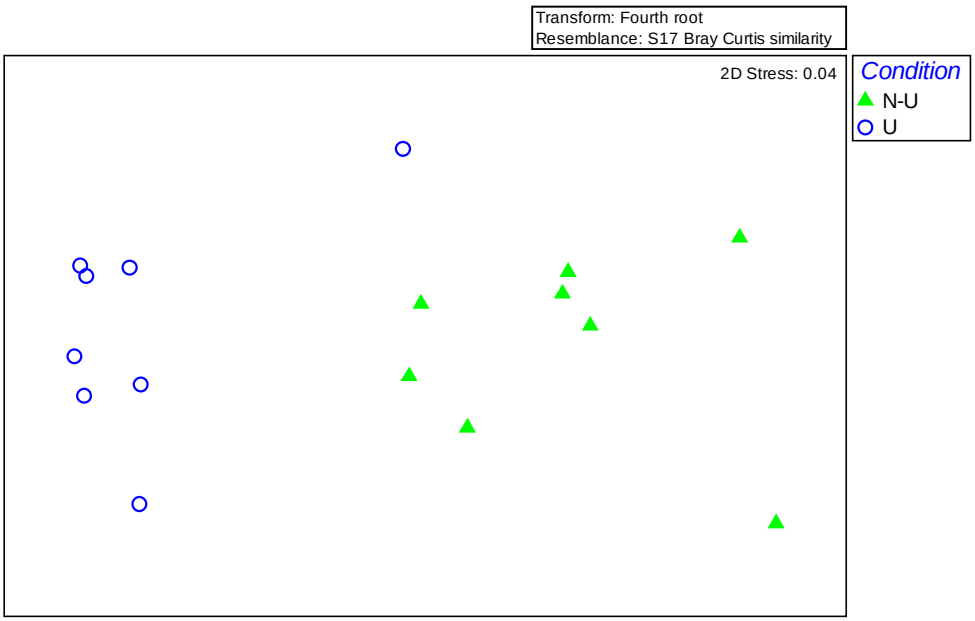


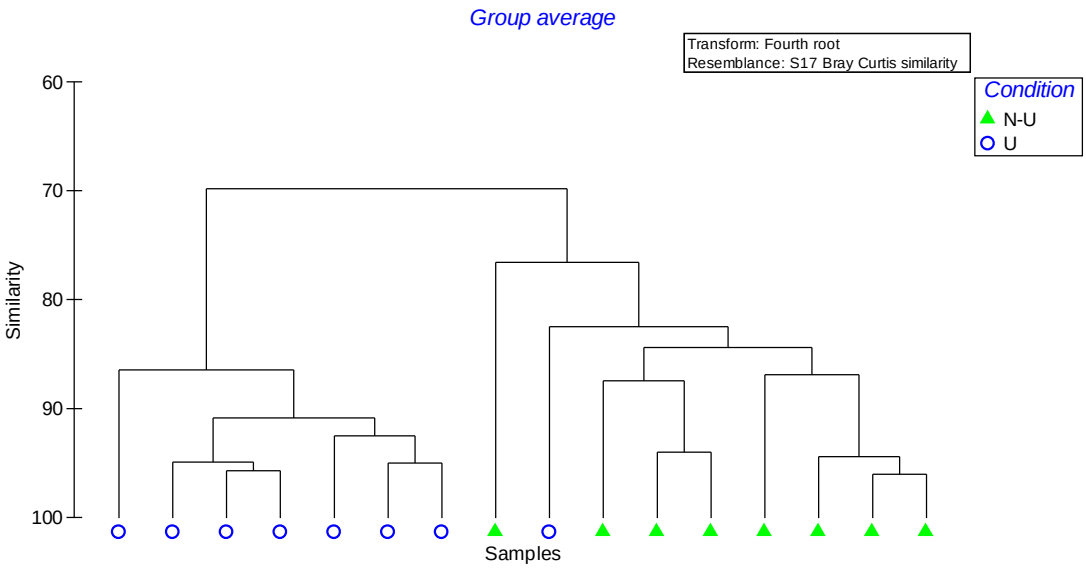
Region B phylum abundance W≠S in Y1; Y1≠Y2 in W; Y1≠Y2 in S.



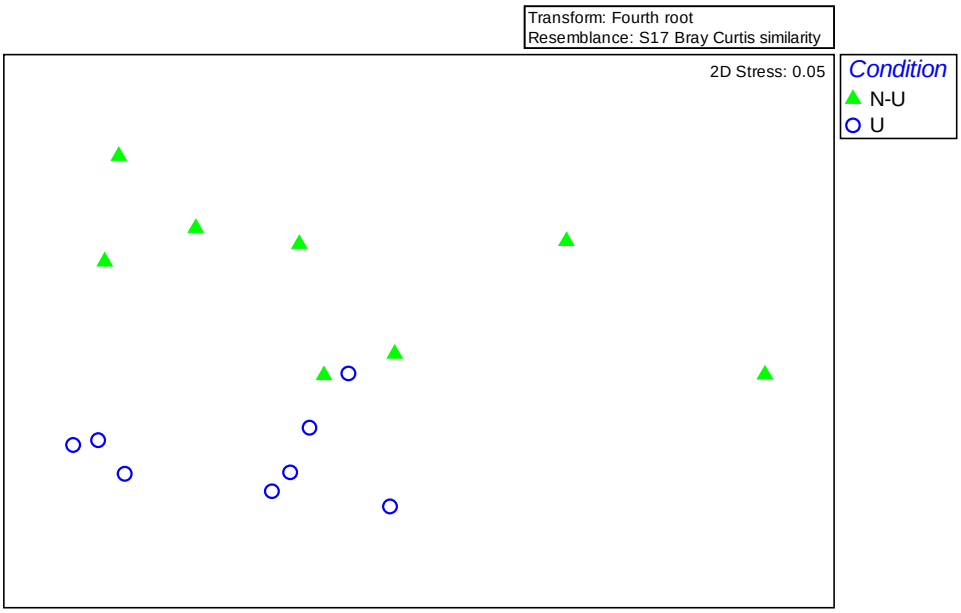


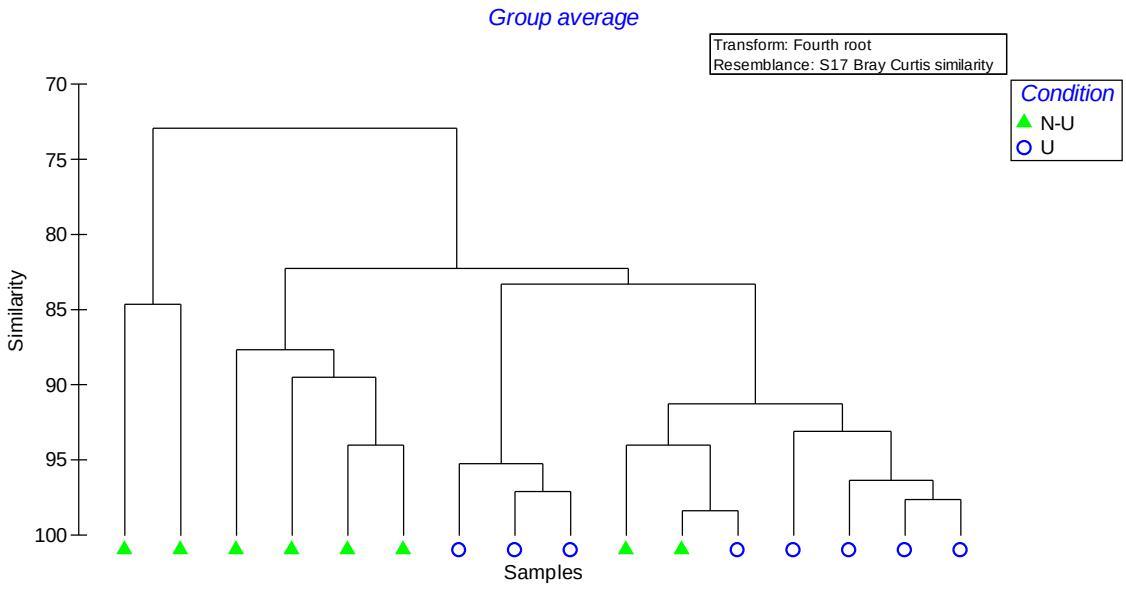
Region B phylum abundance, Condition.



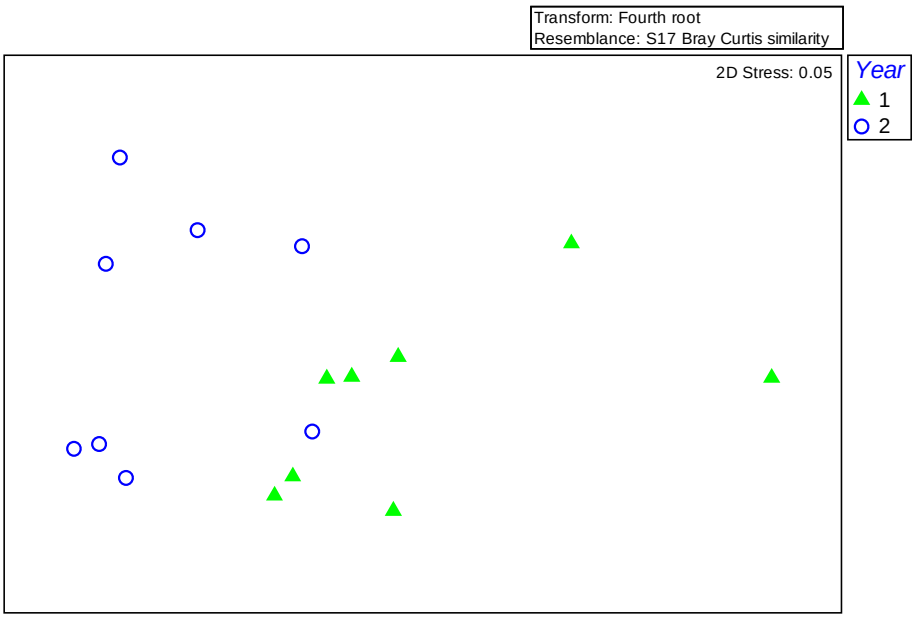


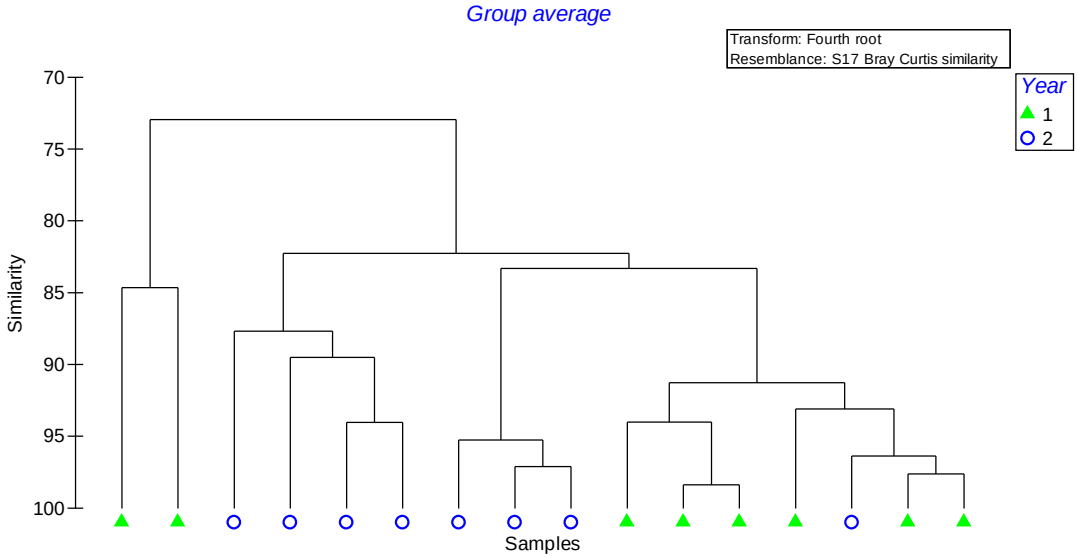
Region A all feeding guilds abundance, Condition.



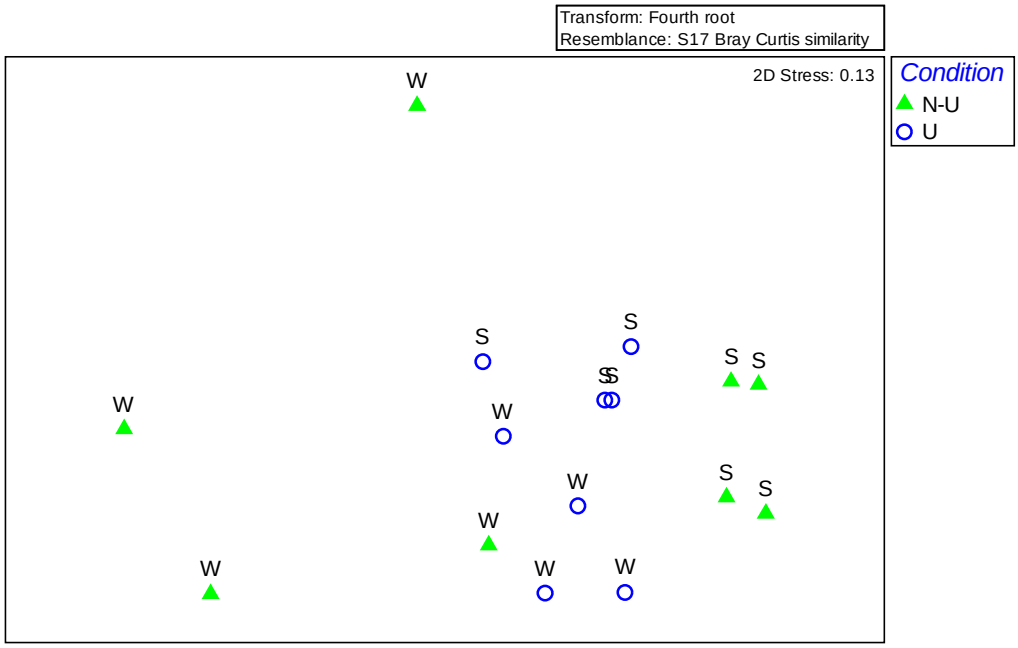


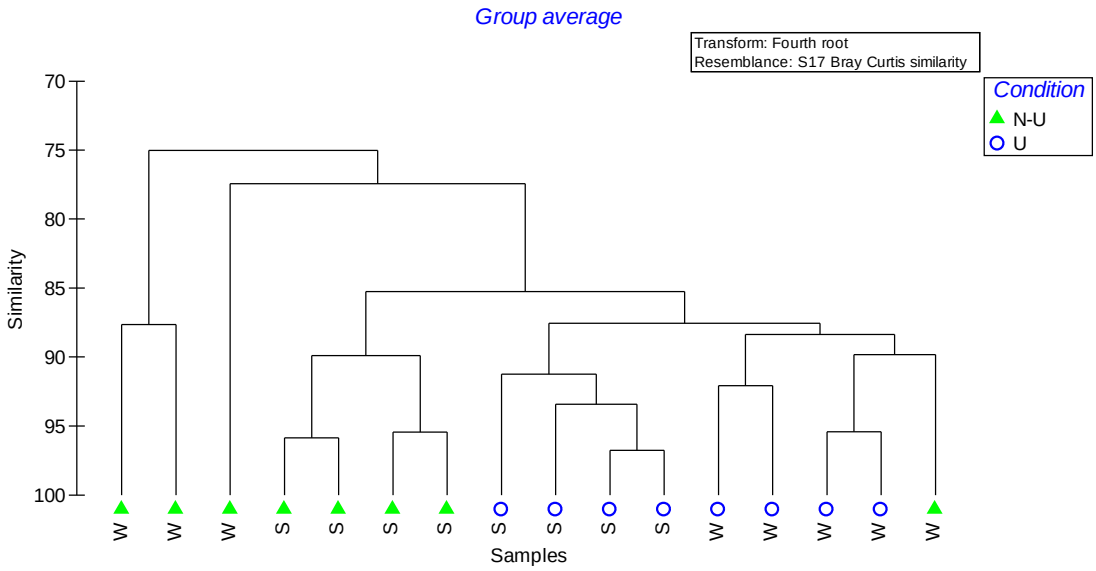
Region B all feeding guilds abundance , Condition.



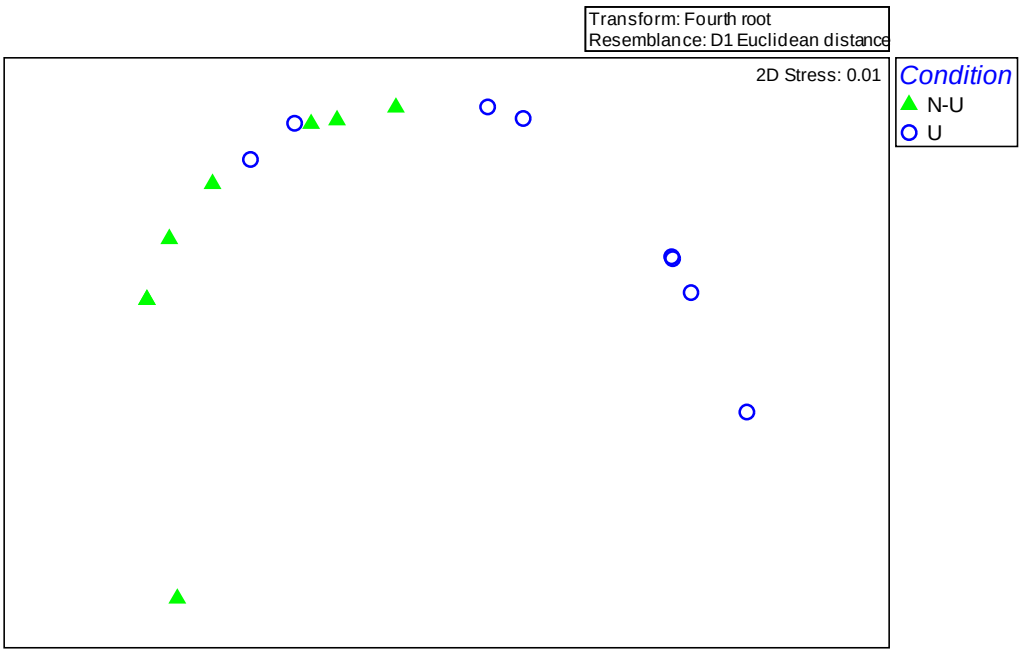


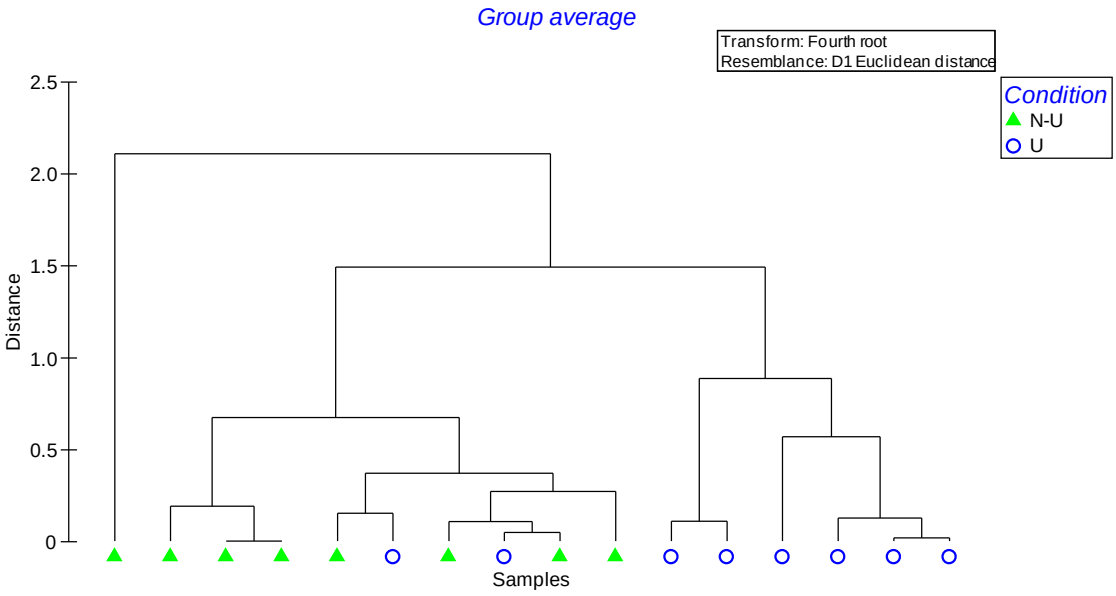
Region B all feeding guilds abundance, Year.



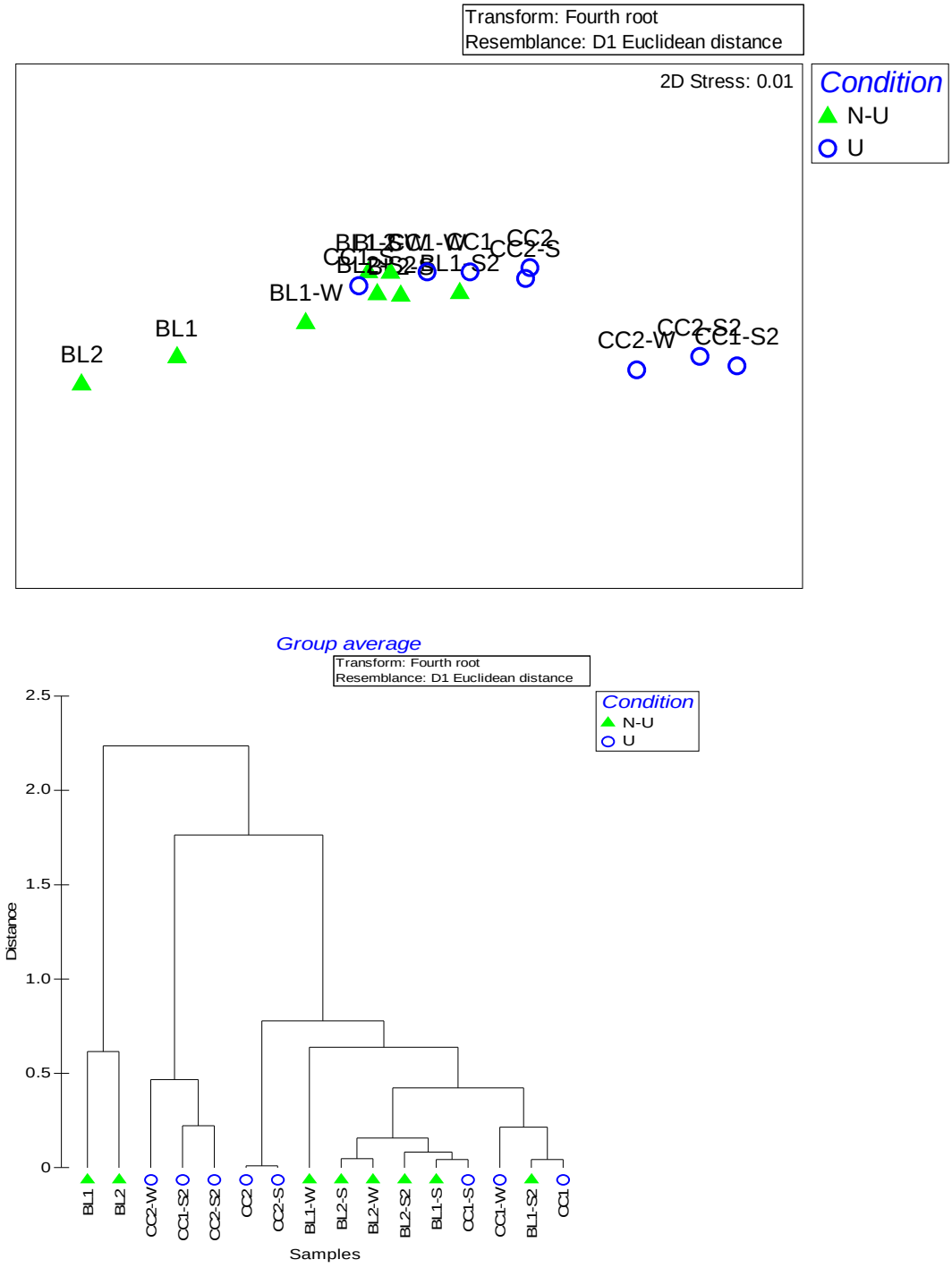


Region D abundance all feeding guilds, U≠NU in S; W≠S in NU; W≠S in U.

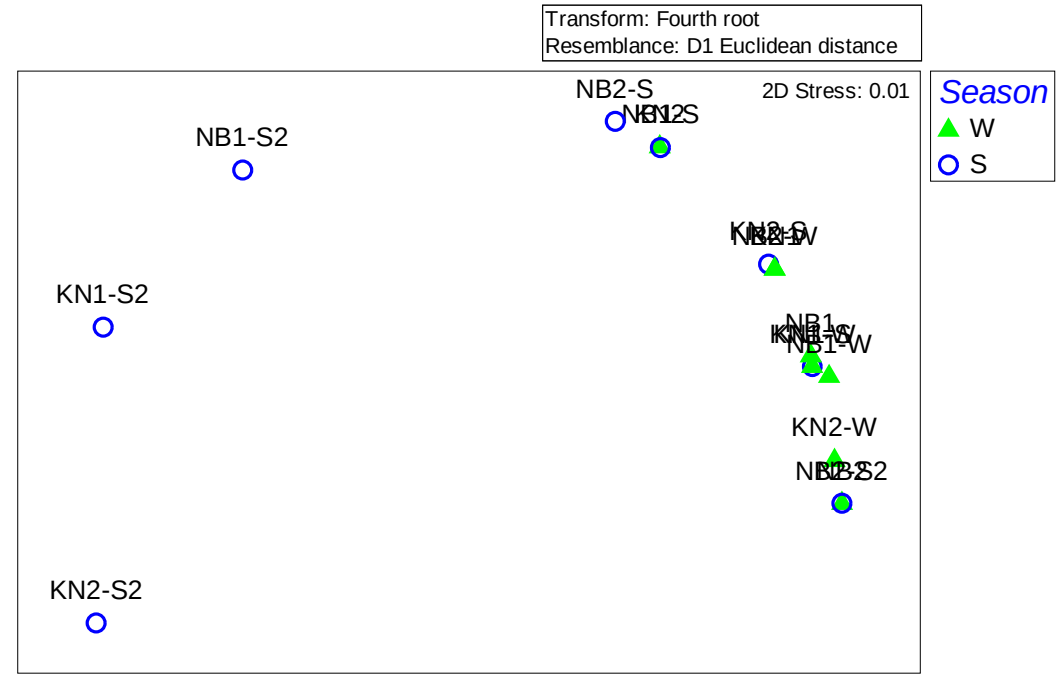


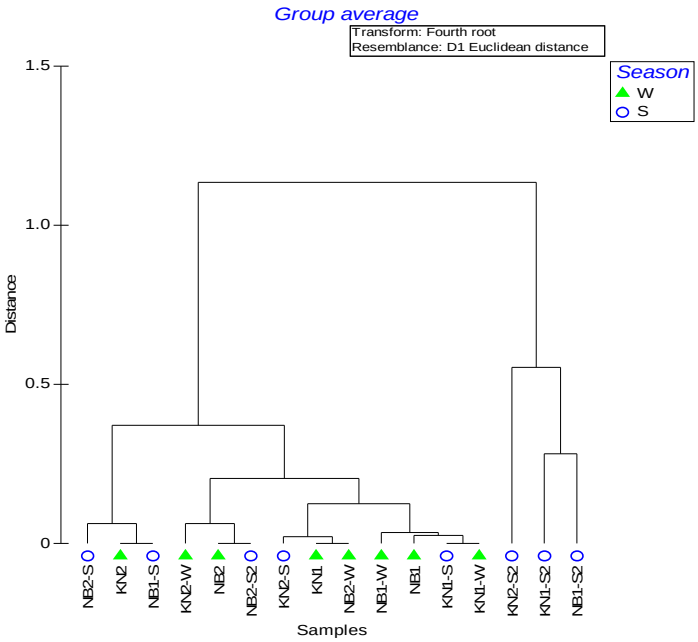


Region A filter feeder abundance, Condition.

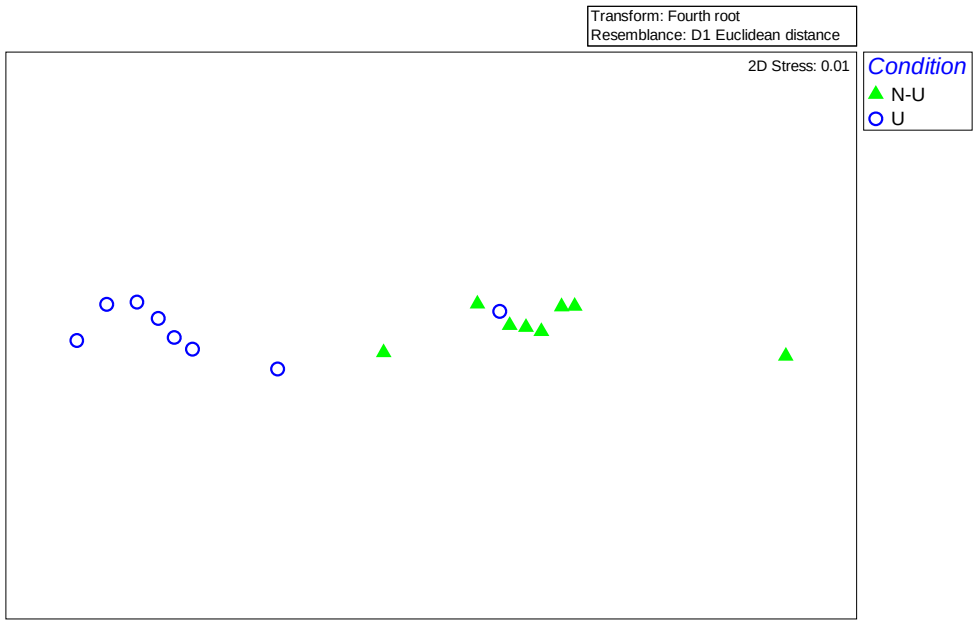


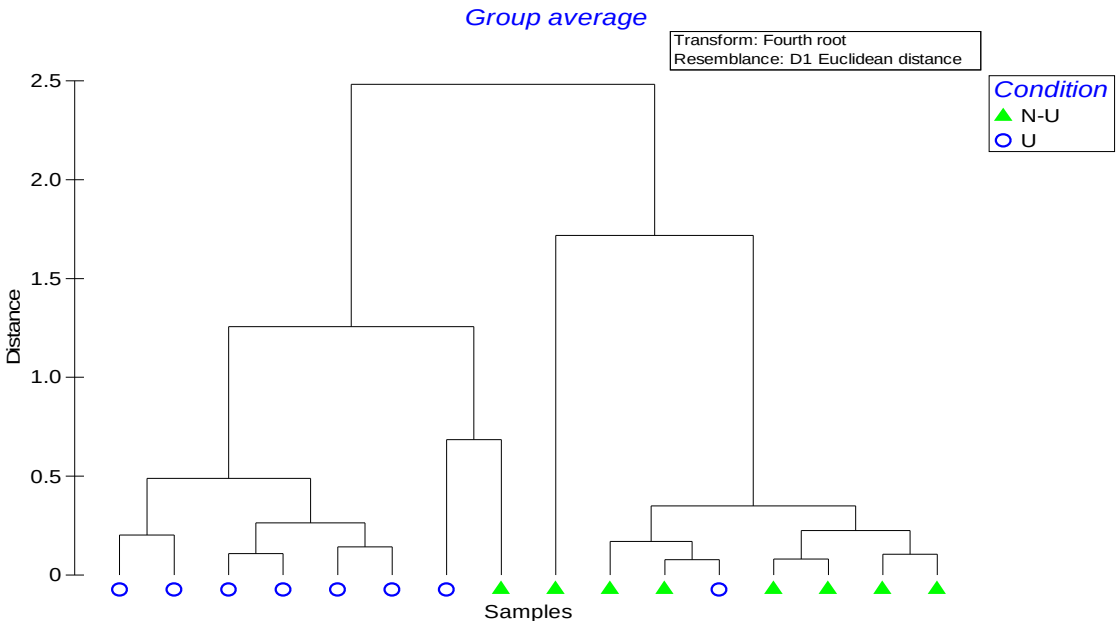
Region B filter feeder abundance. This is a 3-way interaction. CC = Cape Columbine. BL = Sunset Beach. Where there is nothing after the site lable = winter, year 1; S = summer, year 1; W = winter year 2; S2 = summer, year 2. U≠NU in WY1; Y1≠Y2in SY2; W≠S in NUY1



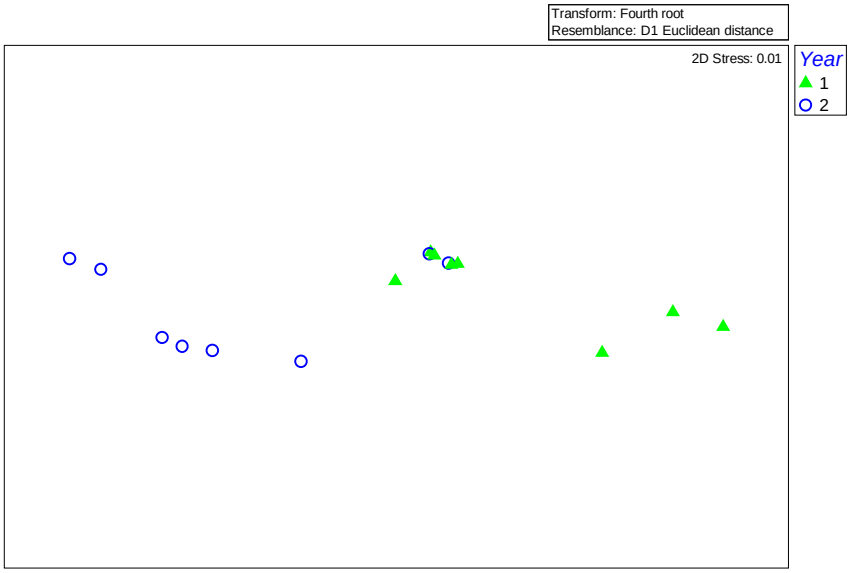


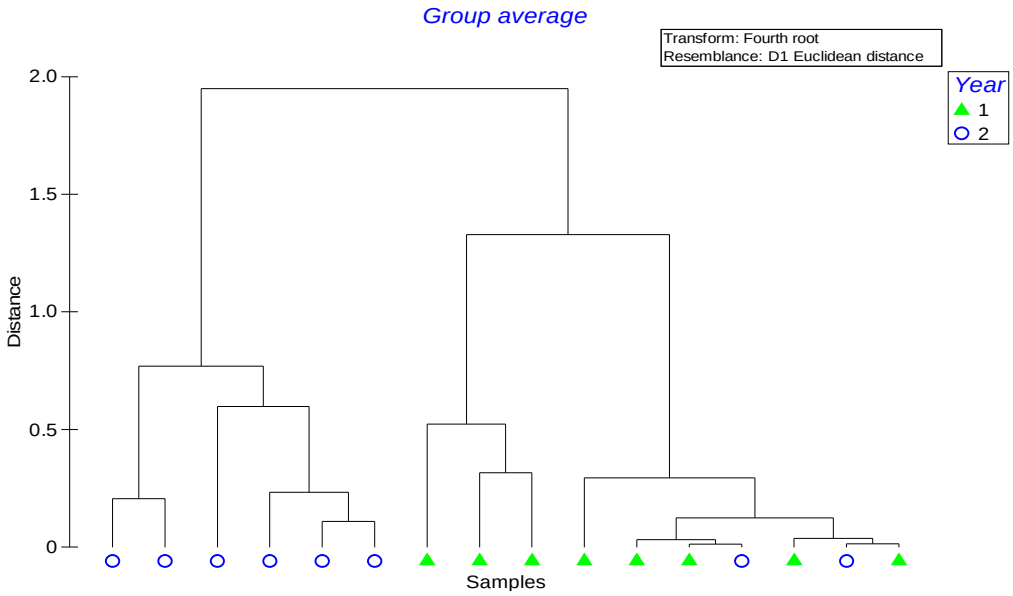
Region C filter feeder abundance. This is a 3-way interaction. KN = Brenton on Sea. NB = Glentana. Where there is nothing after the site lable = winter, year 1; S = summer, year 1; W = winter year 2; S2 = summer, year 2. W≠S in NUY1; W≠S in UY2; Y1≠Y2 in US.



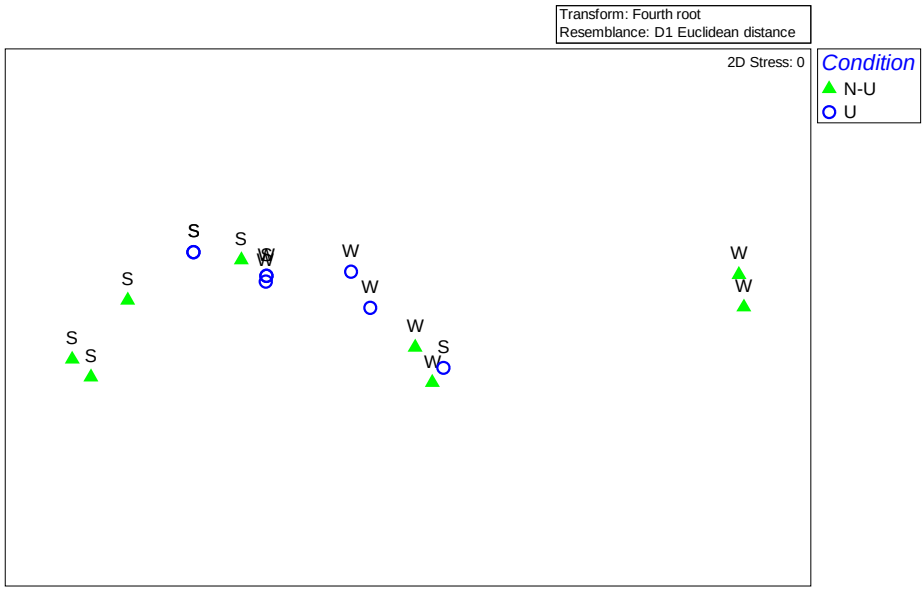


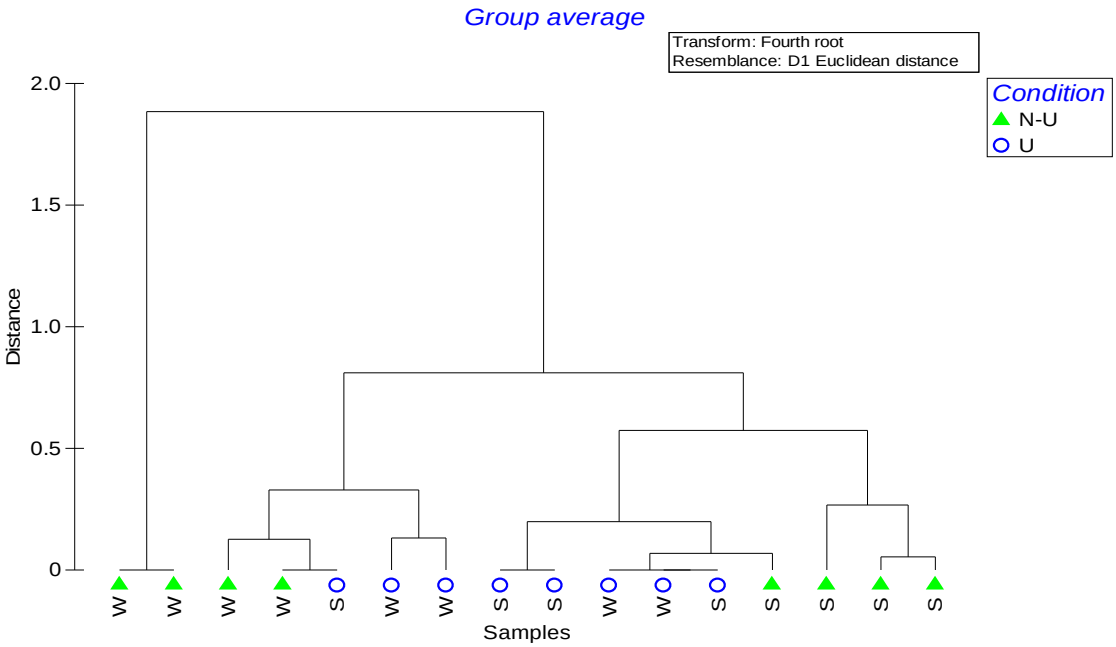
Region A Deposit feeder abundance, Condition.



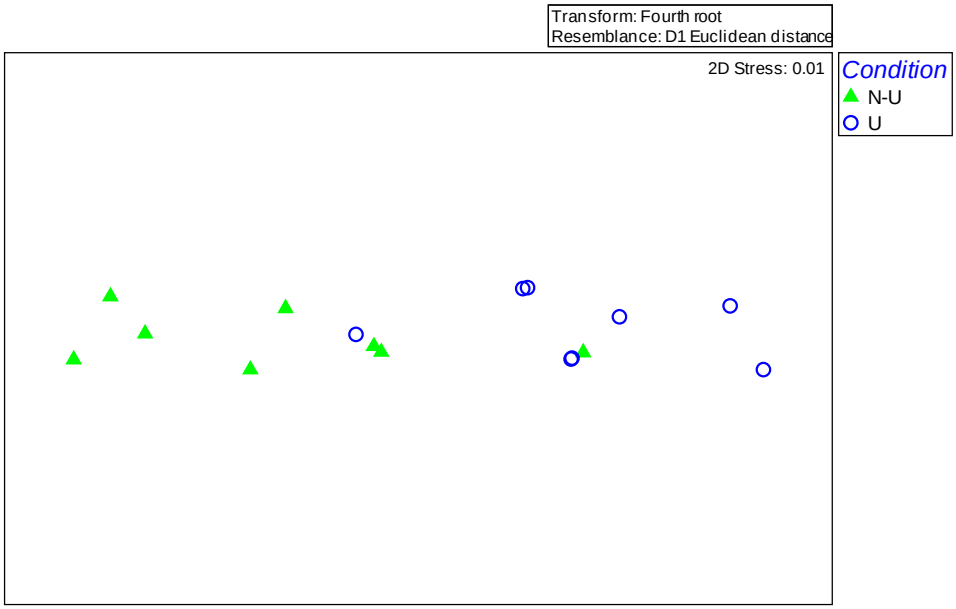


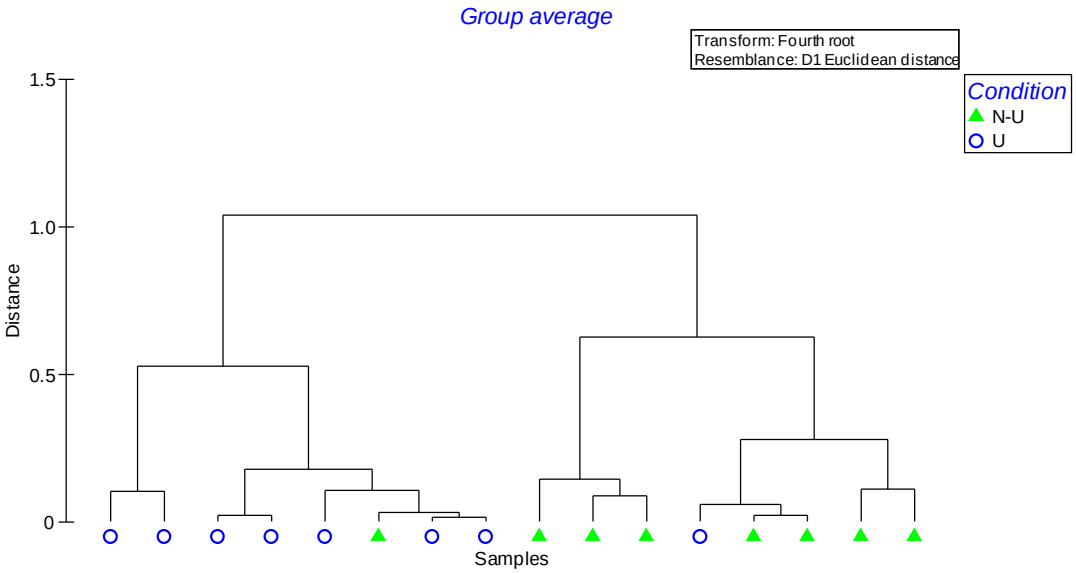
Region B deposit feeder abundance, Year.



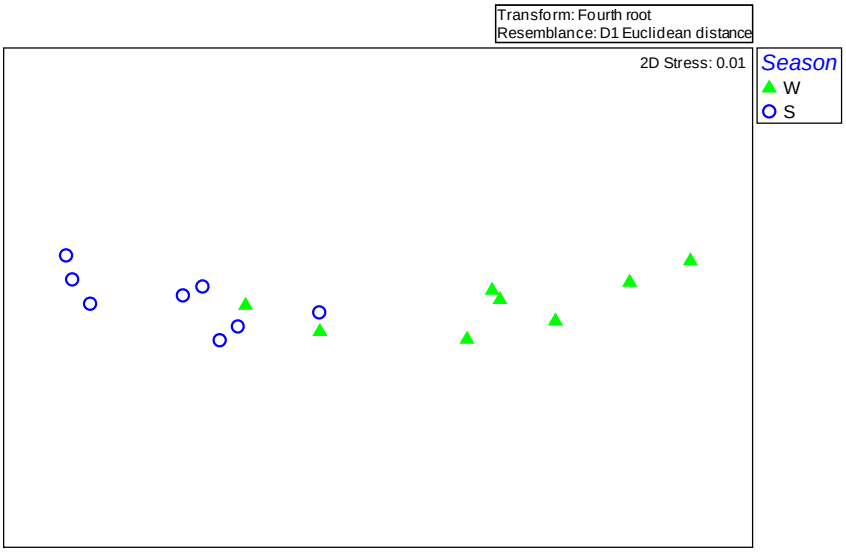


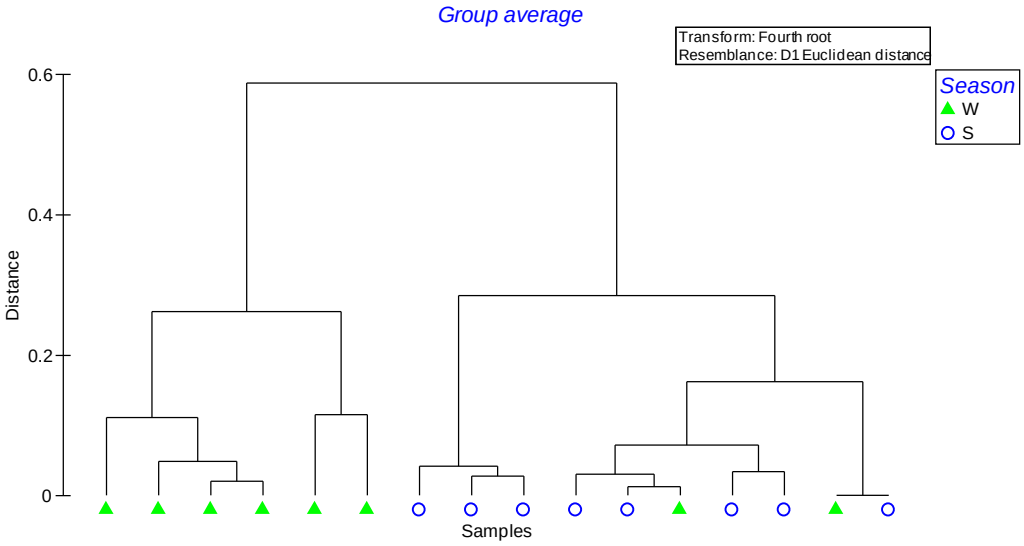
Region D Deposit feeder abundance, W≠S in NU.



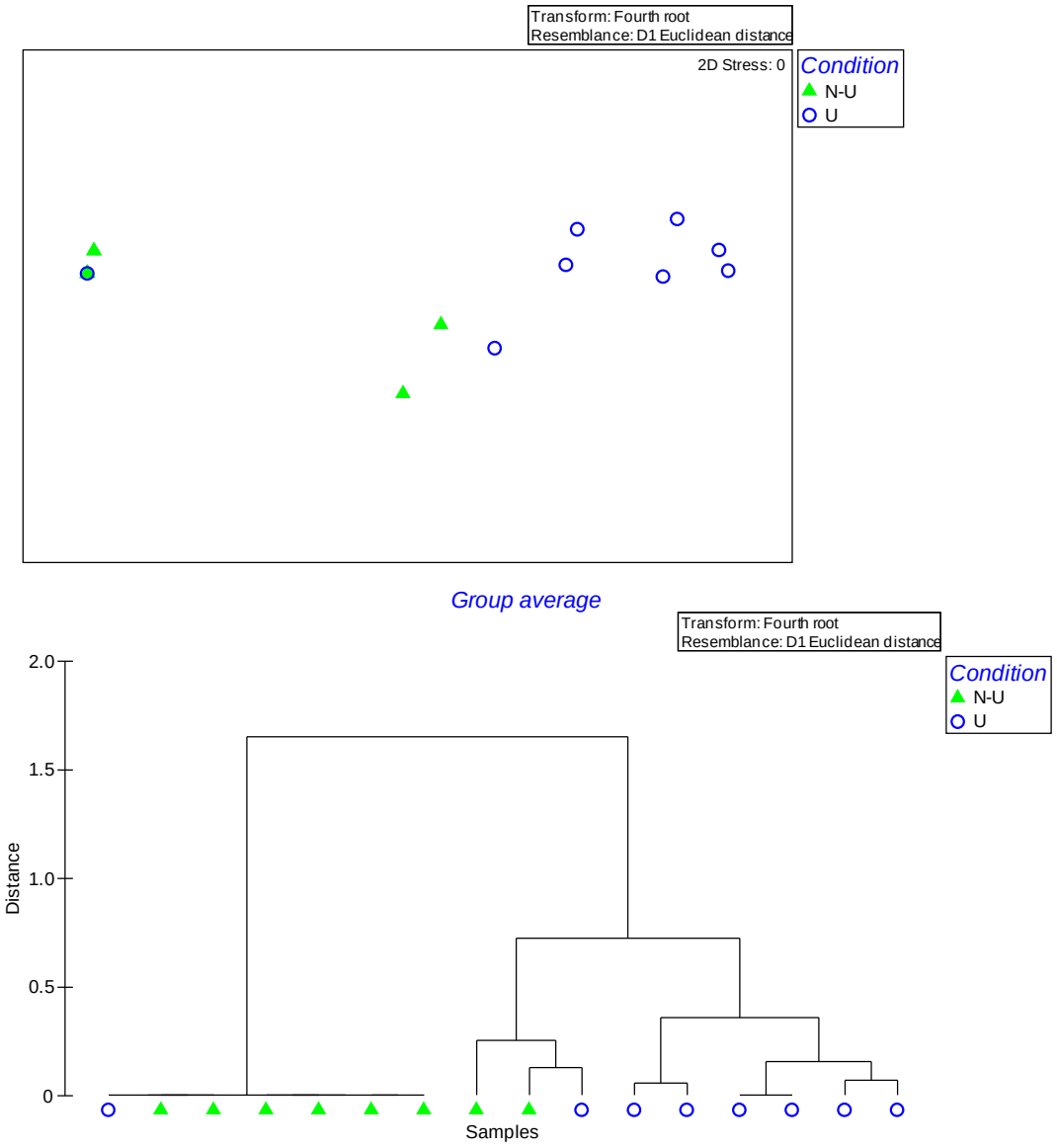


Region B scavenger abundance, Condition.

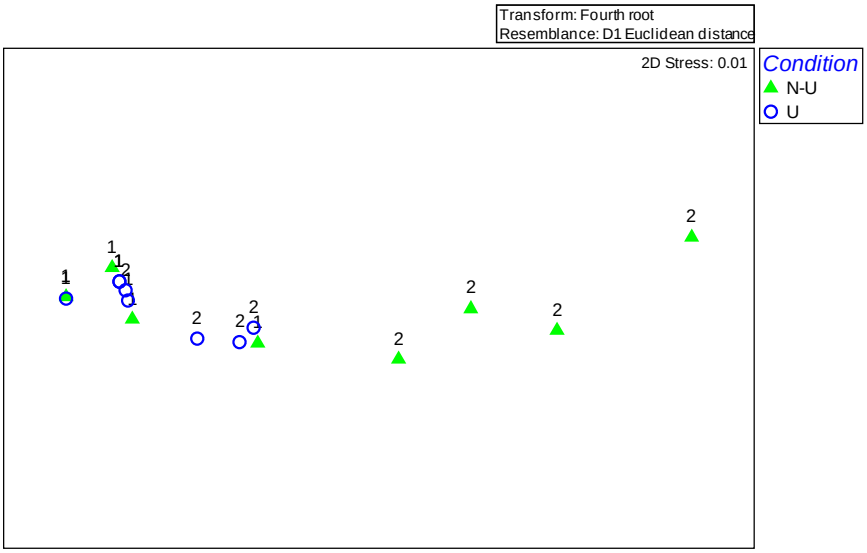


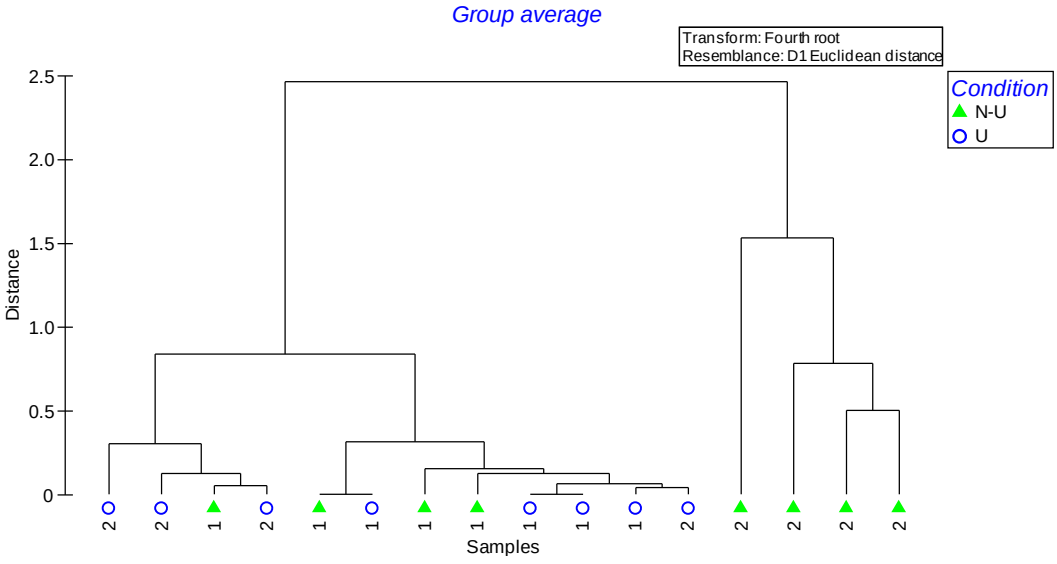


Region D scavenger abundance, Season.

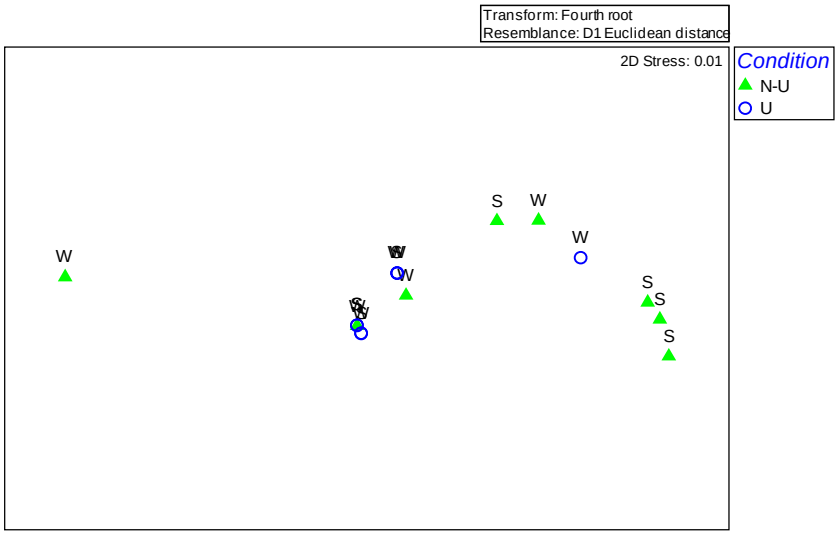


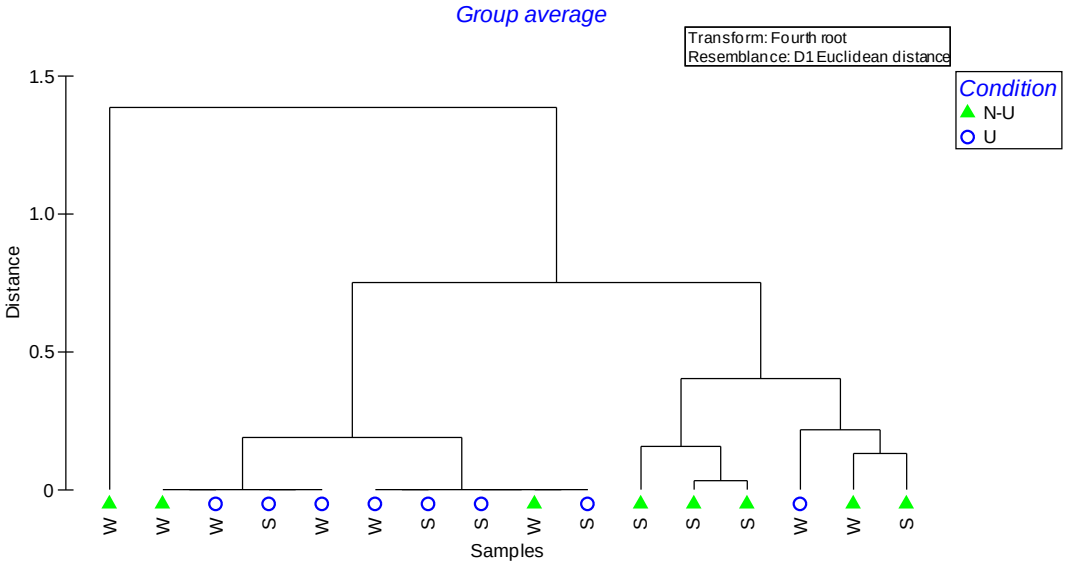
Region A predator abundance, Condition.



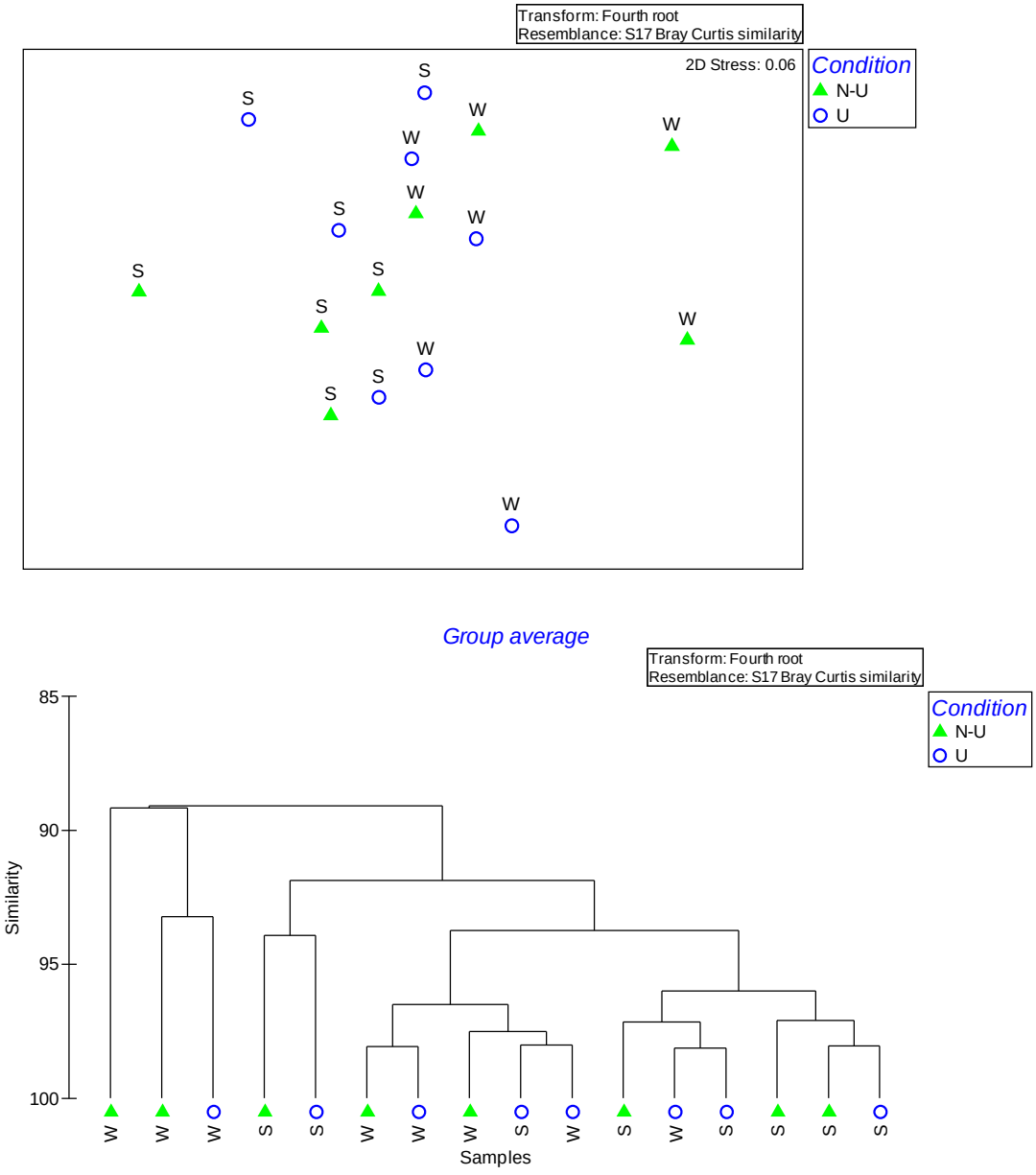


Region B predator abundance, U≠NU in Y2; Y1≠Y2 in U; Y1≠Y2 in NU.

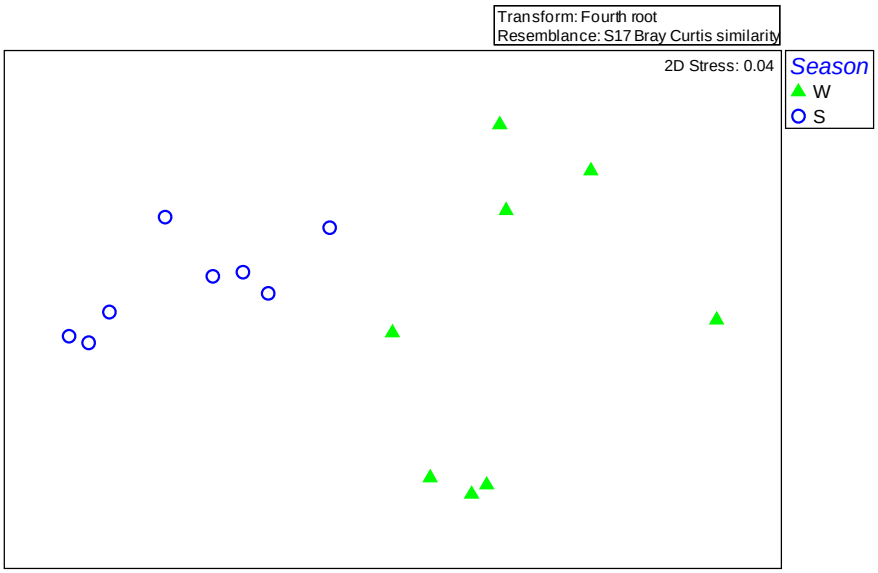


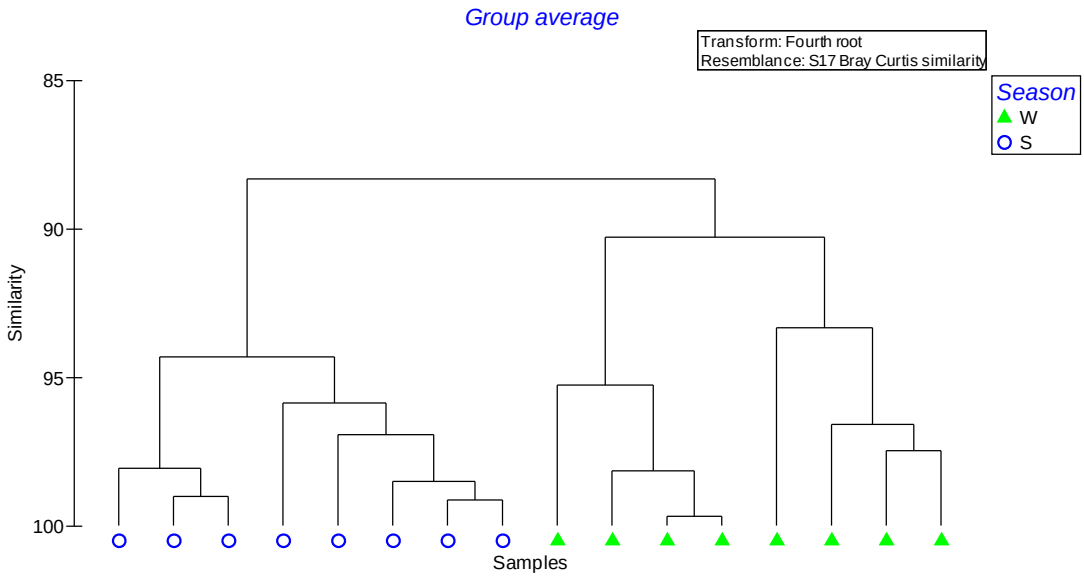


Region D predator abundance, U≠NU in S.

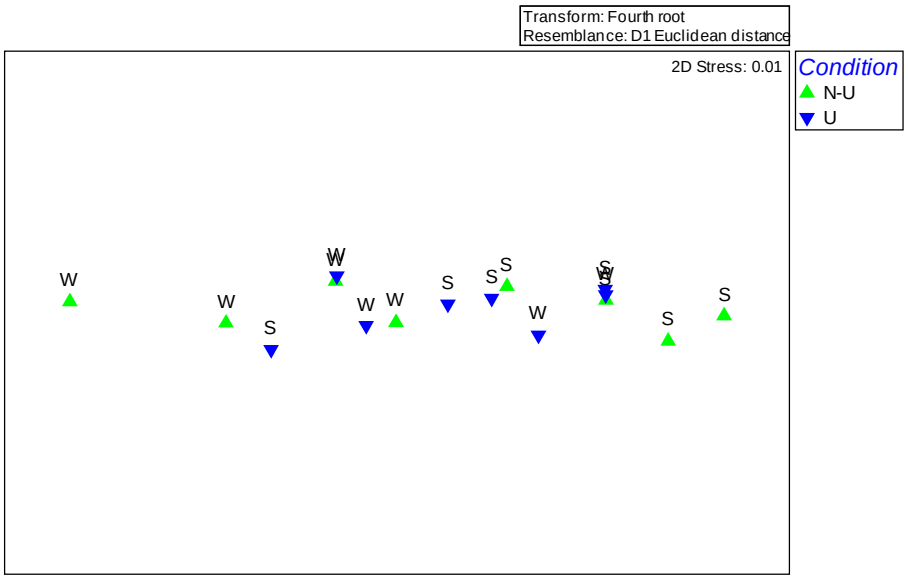


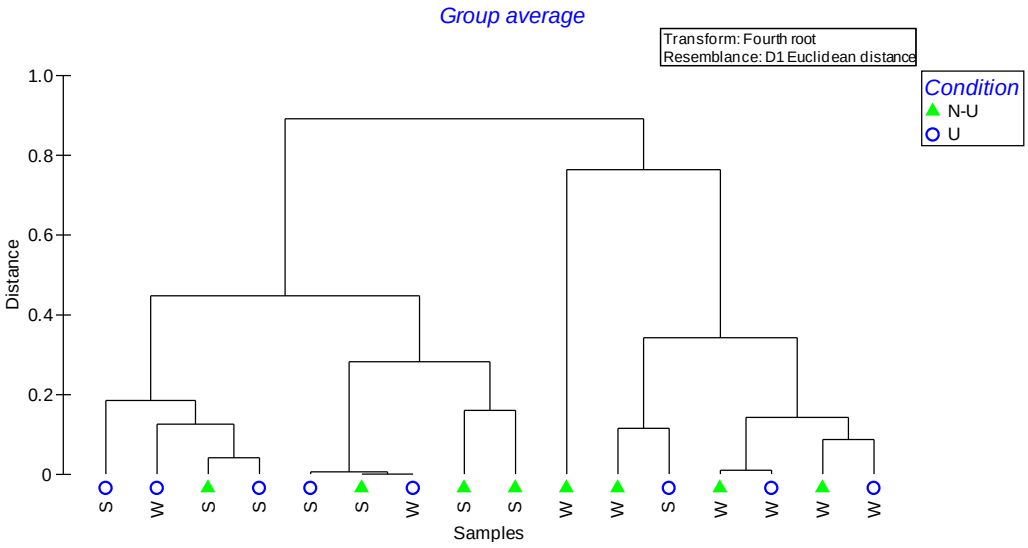
Region A both developmental mode abundance, W≠S in NU.



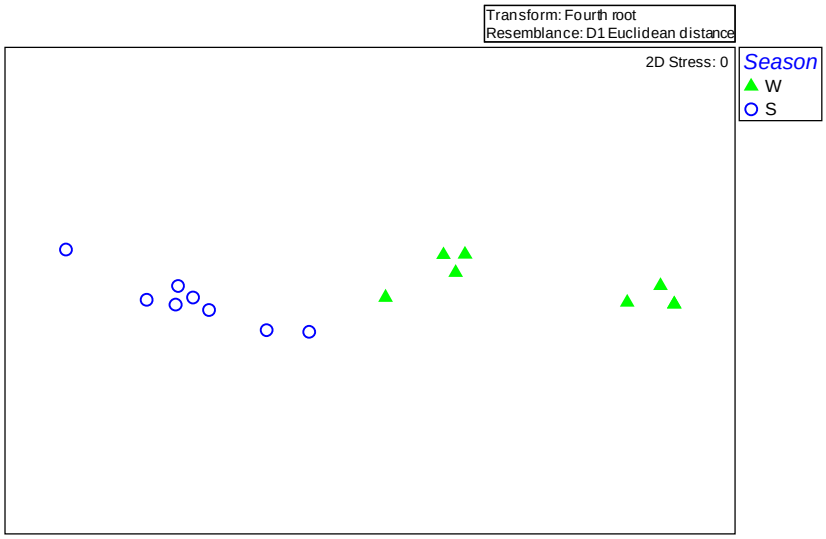


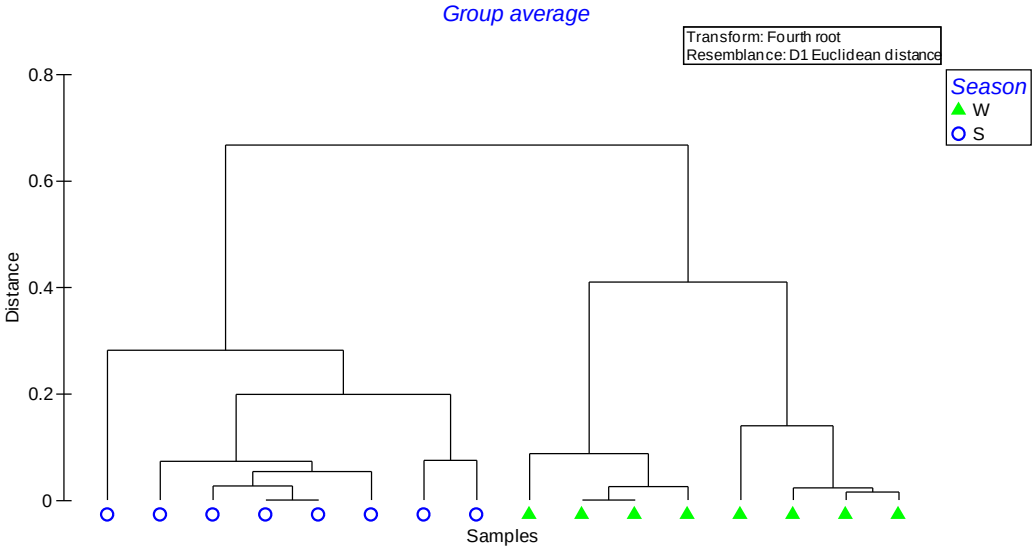
Region D both developmental modes abundance, Season.



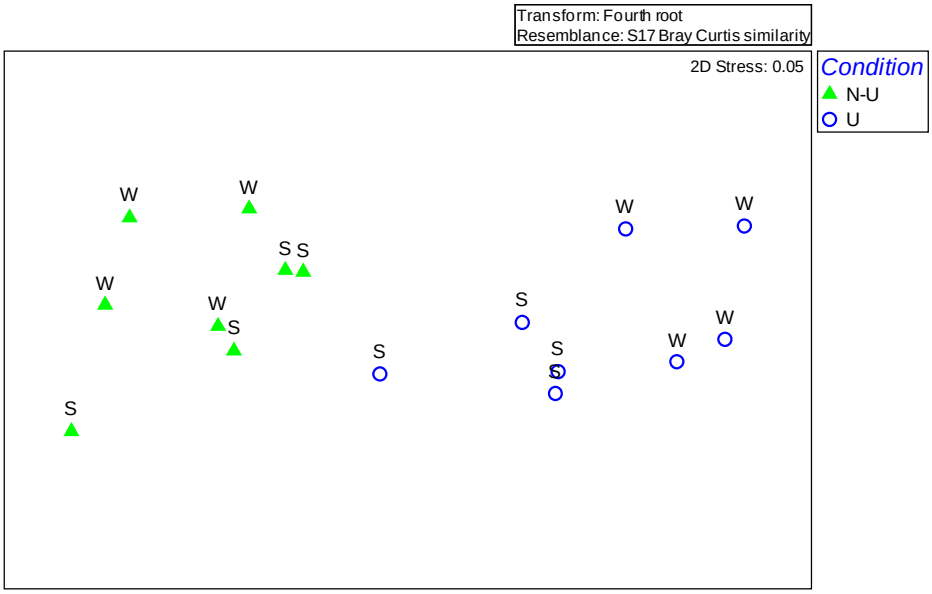


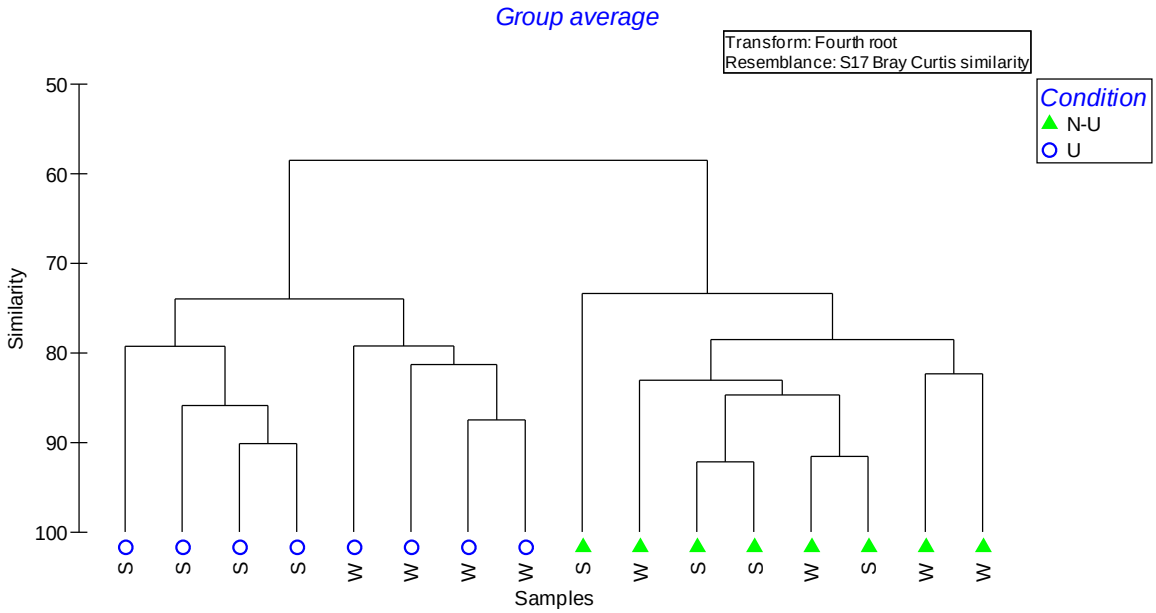
Region A indirect developer abundance, W≠S in NU.



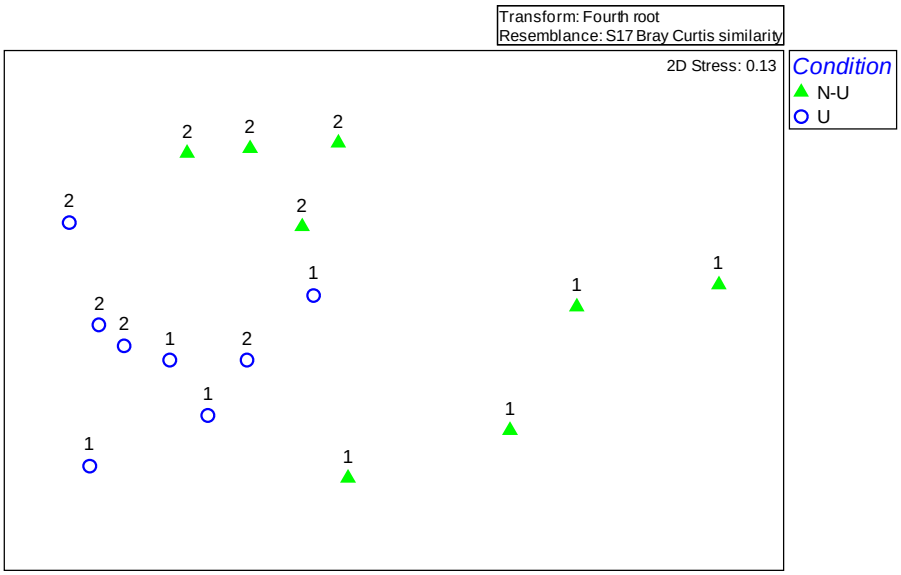


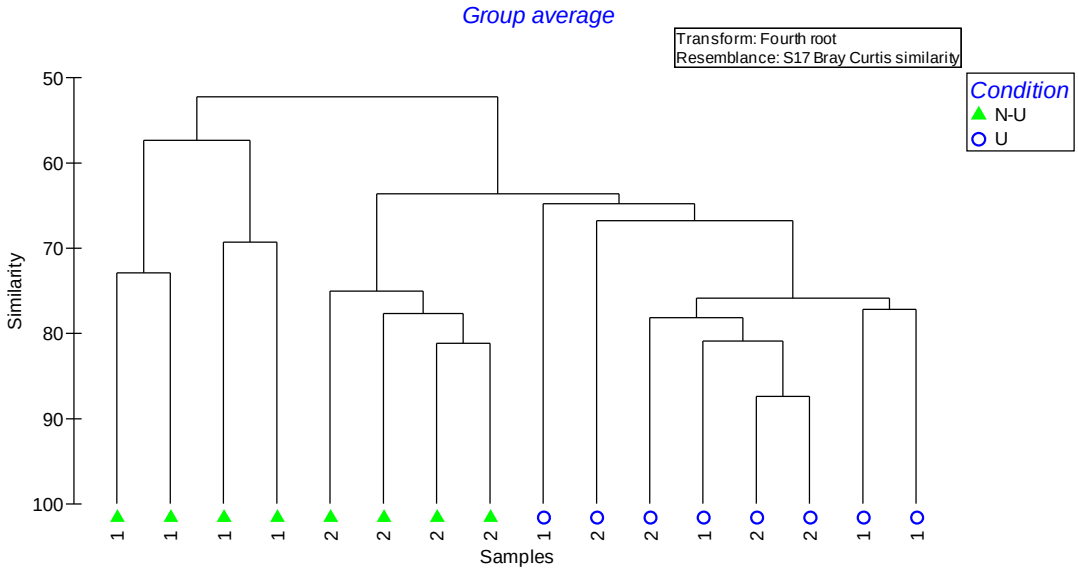
Region D indirect developer abundance, Season.



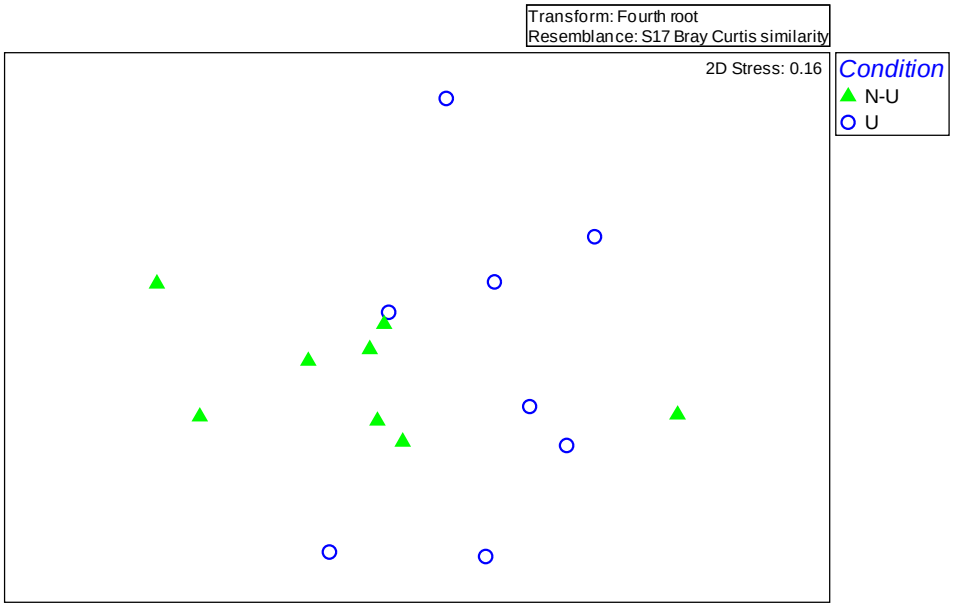


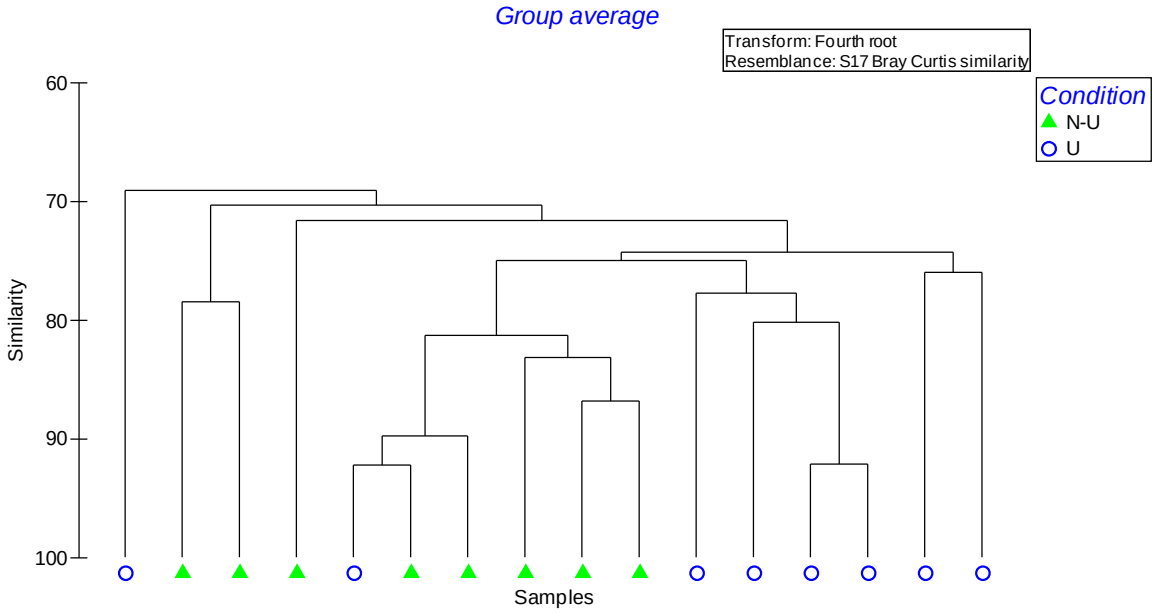
Region A species biomassU≠NU in W; U≠NU in S; W≠S in U.



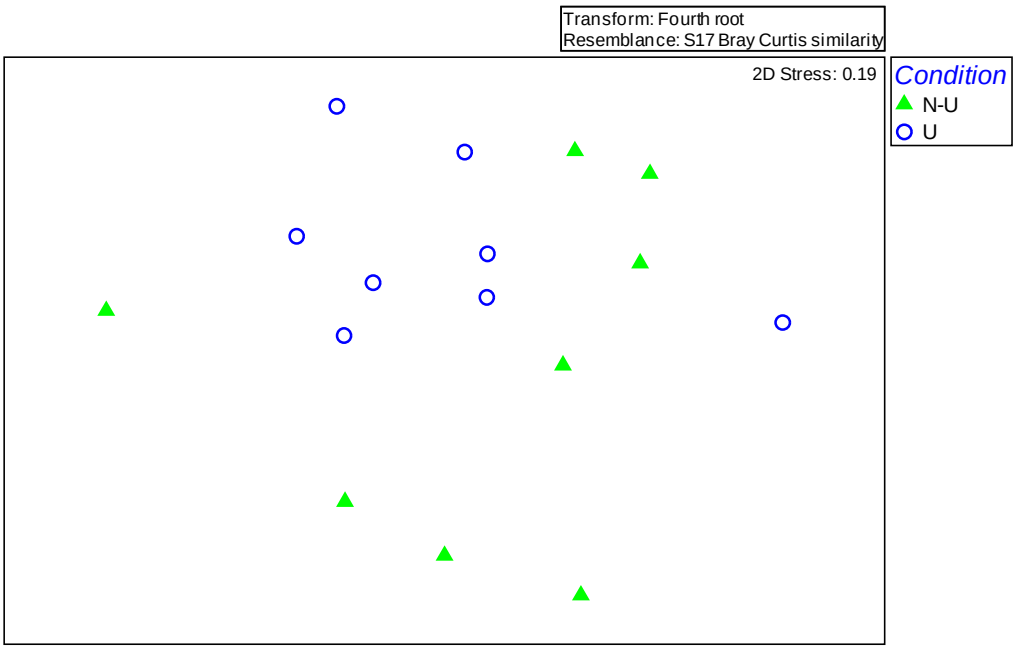


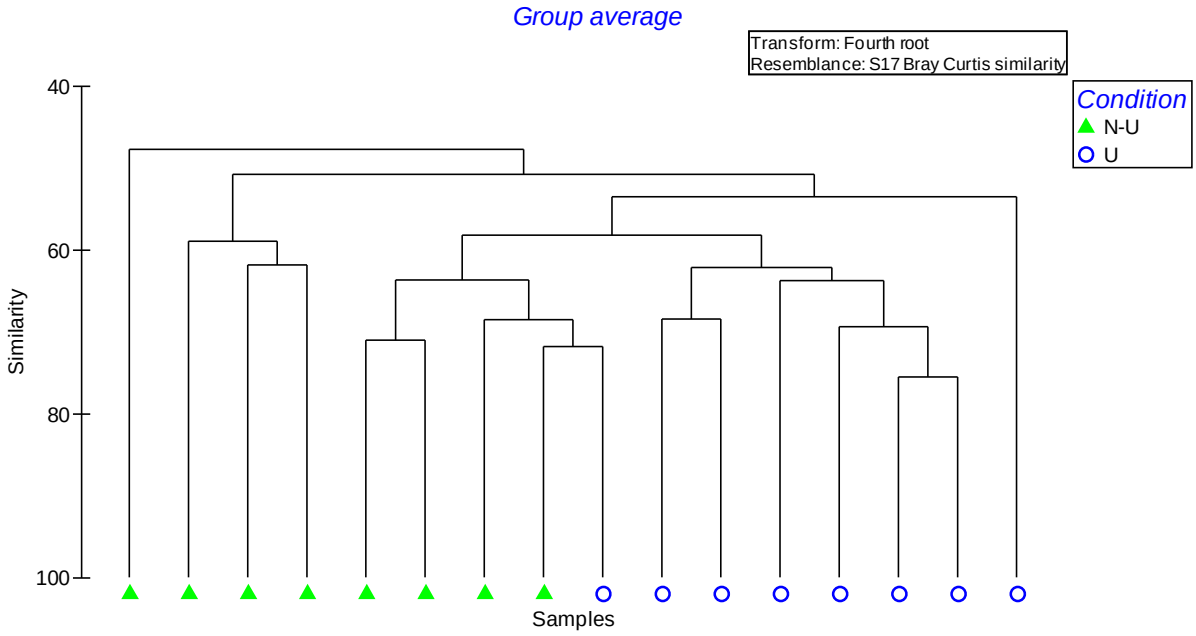
Region B species biomass, Y1≠Y2 in NU; U≠NU in Y1; U≠NU in Y2.



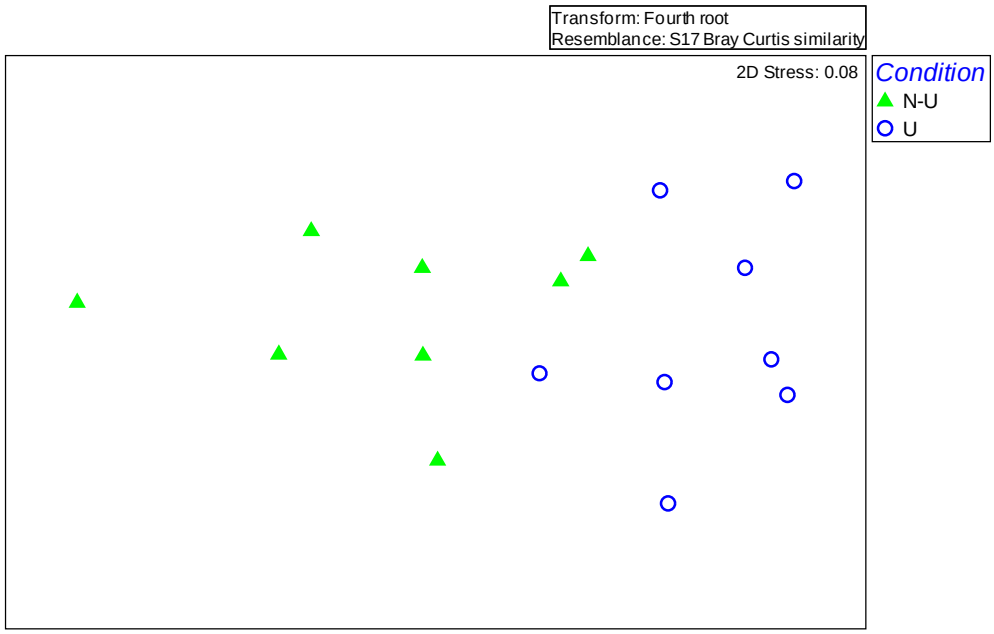


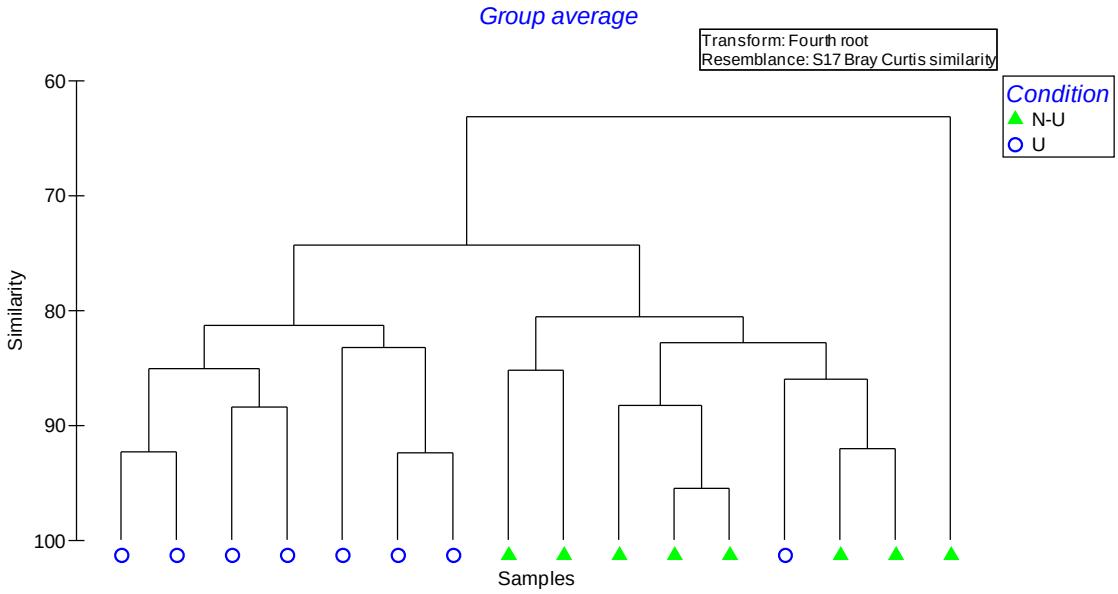
Region C species biomass, Condition.



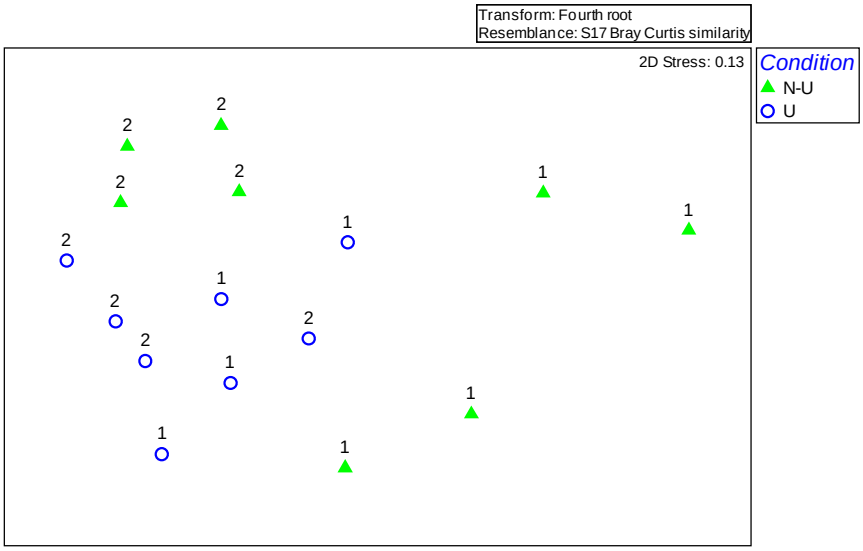


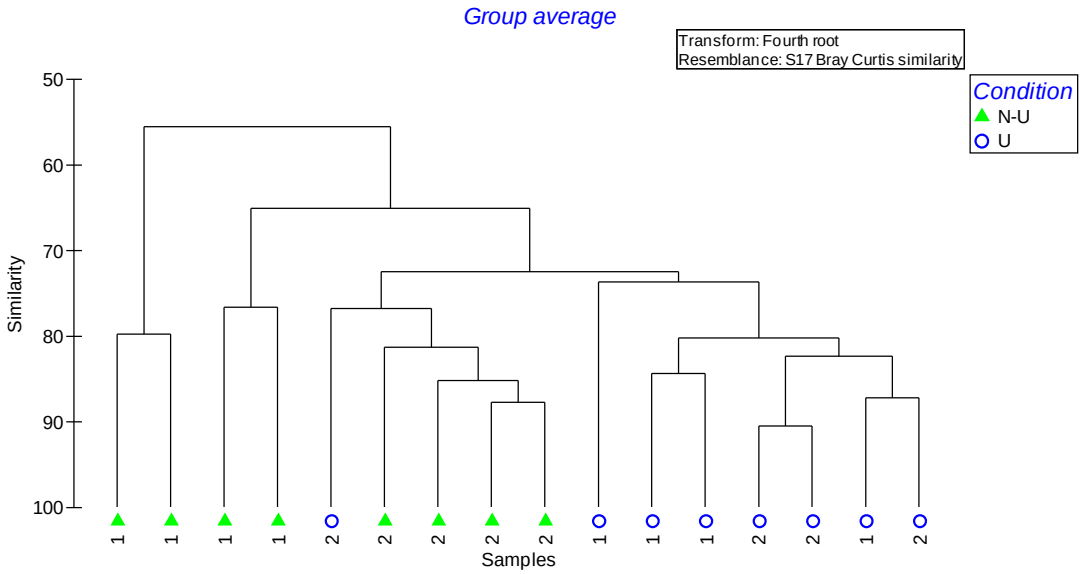
Region D species biomass, Condition.



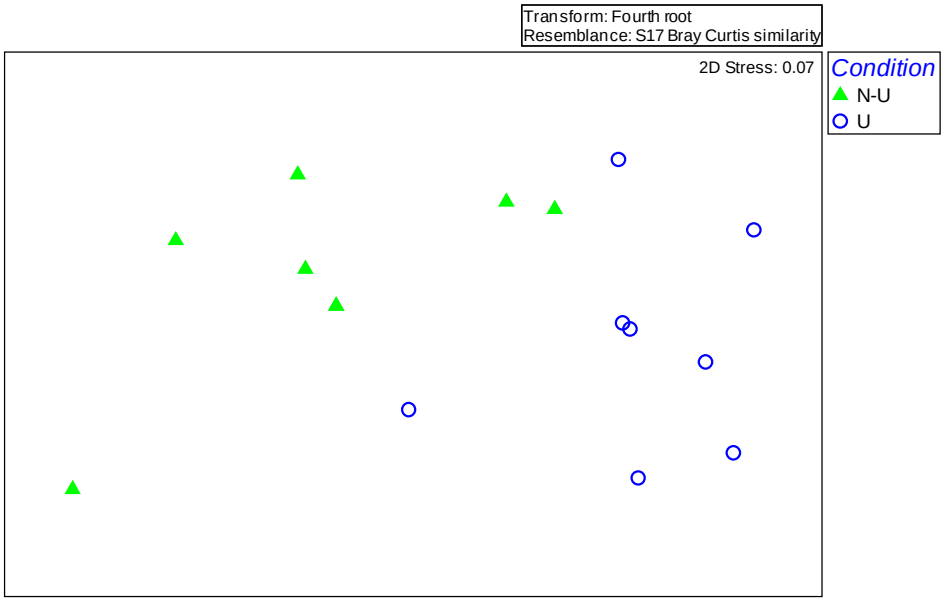


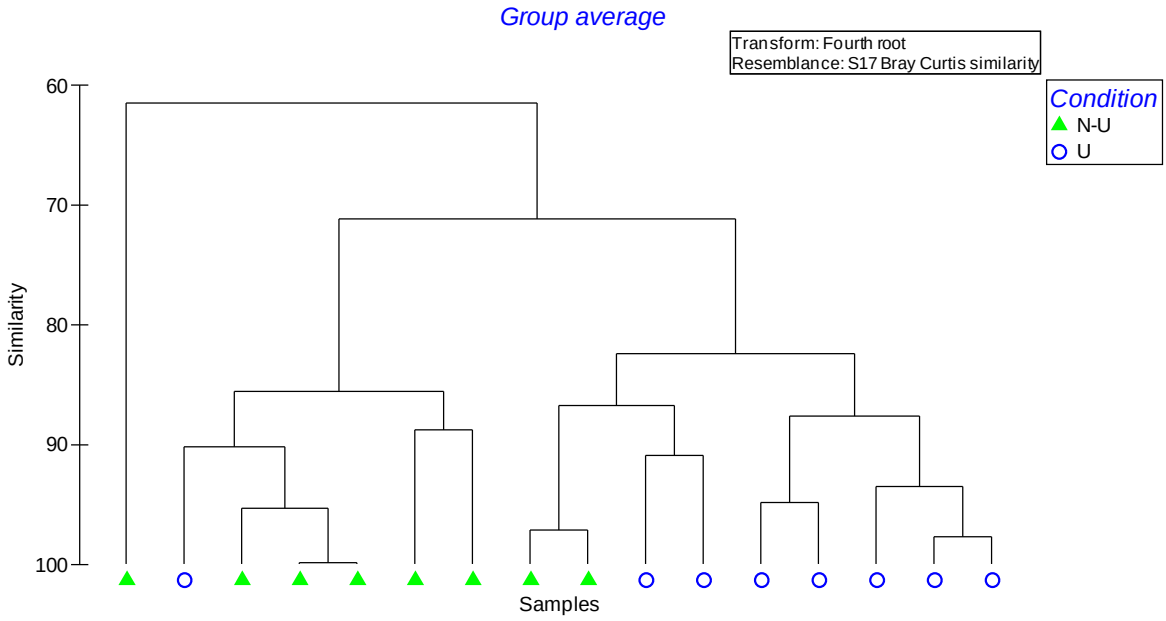
Region A order biomass, Condition.



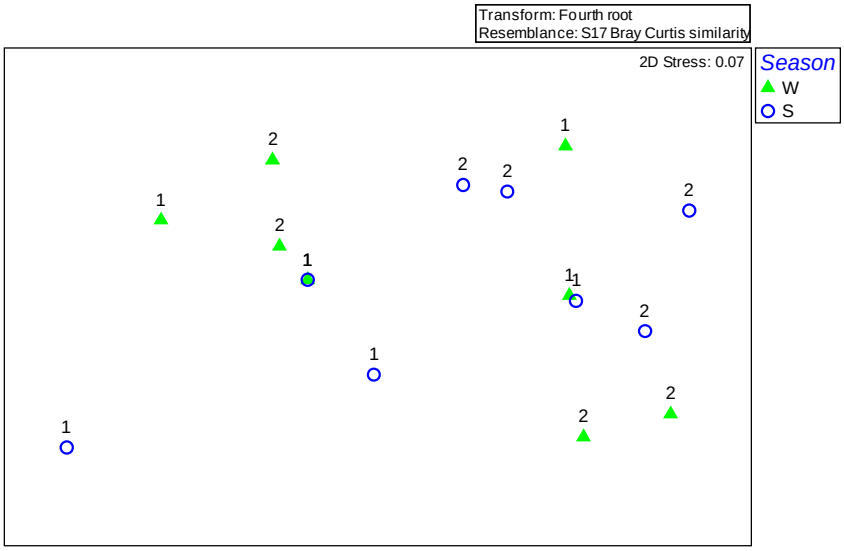


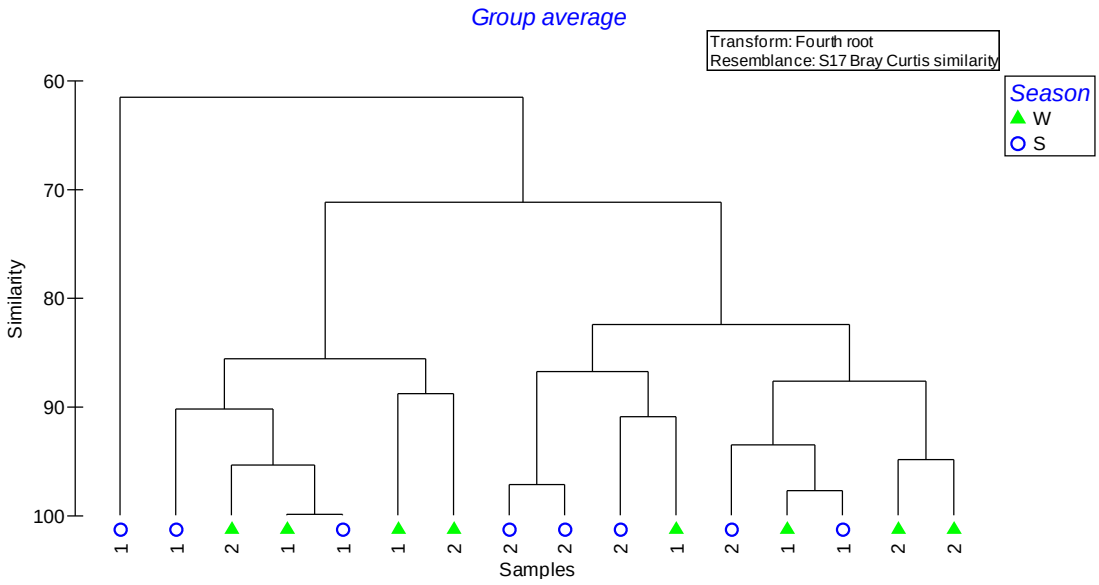
Region B order biomass, Y1≠Y2 in NU; U≠NU in Y1; U≠NU in Y2.





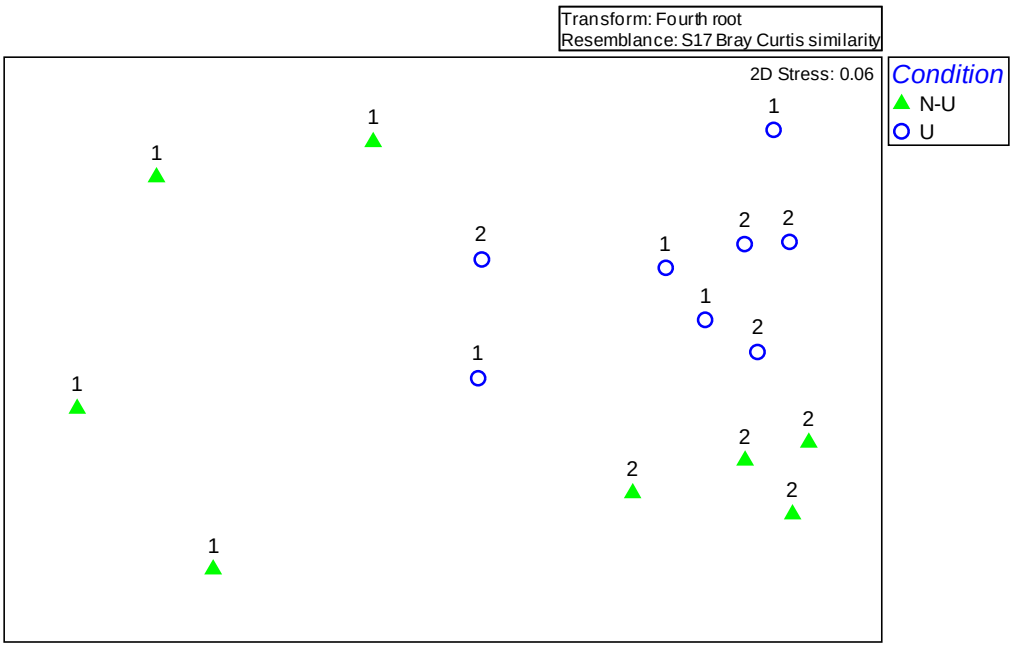
Region A phylum biomass, Condition.

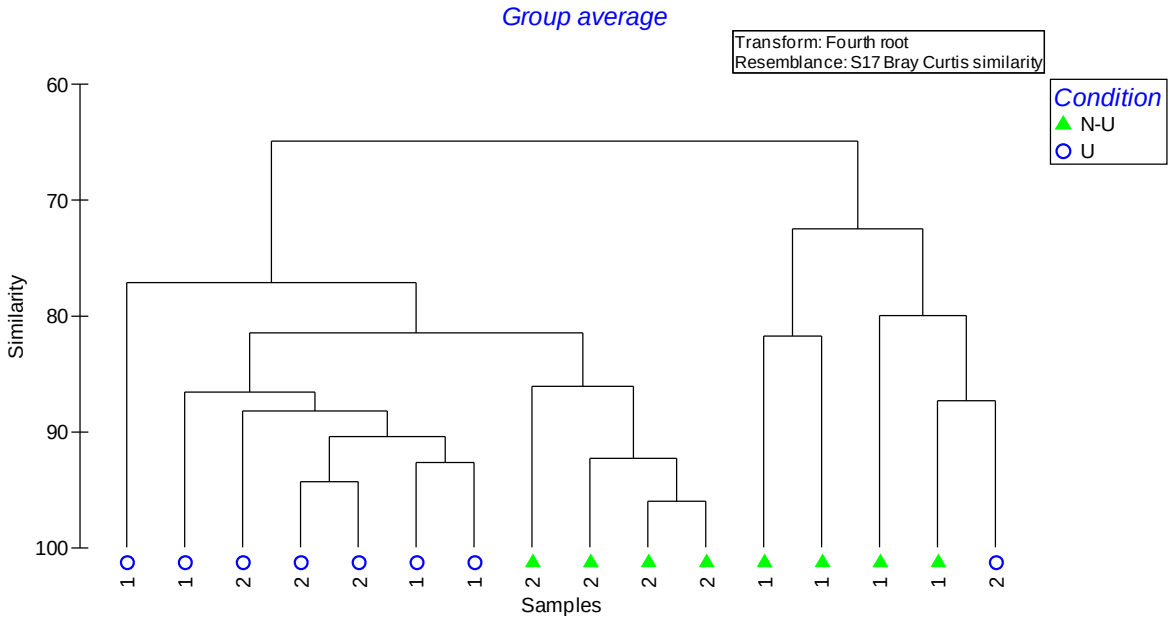




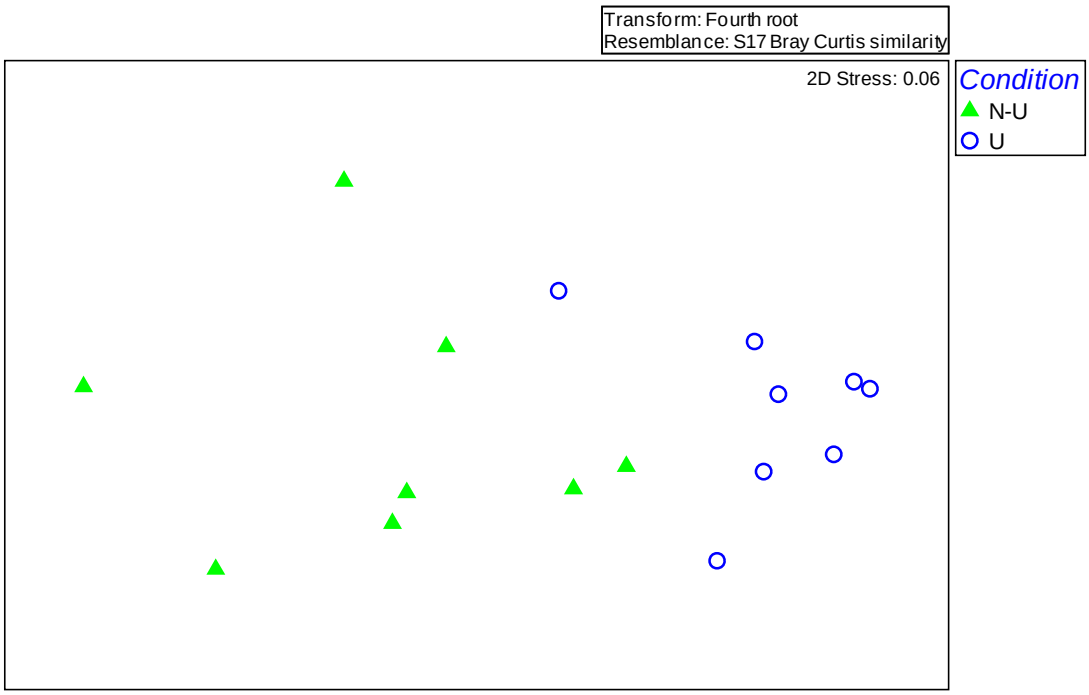
Region A phylum biomass, W≠S in Y2

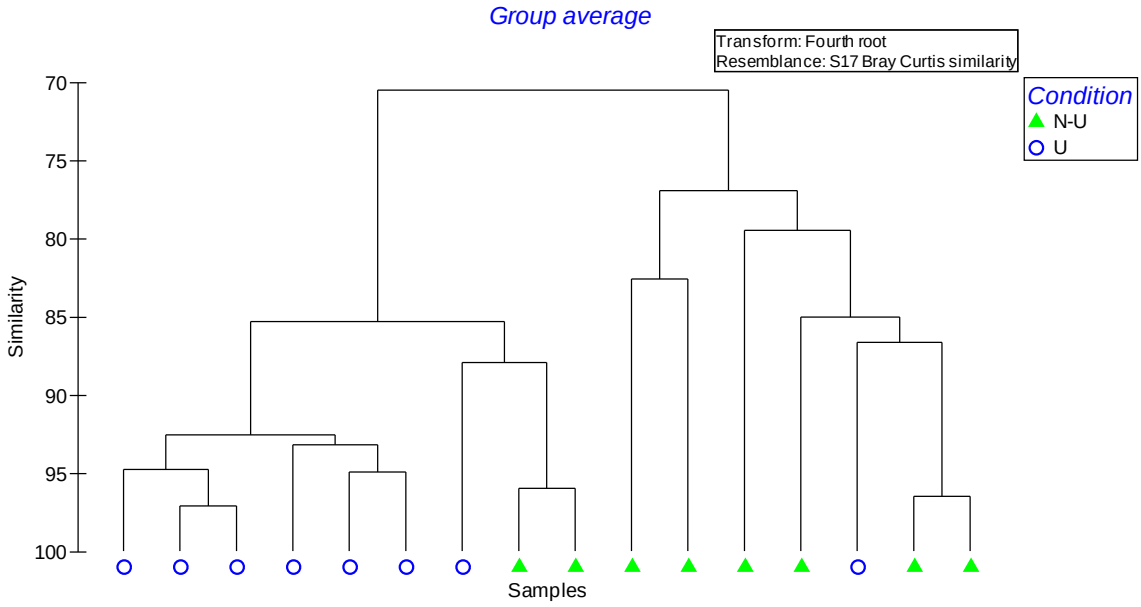
.



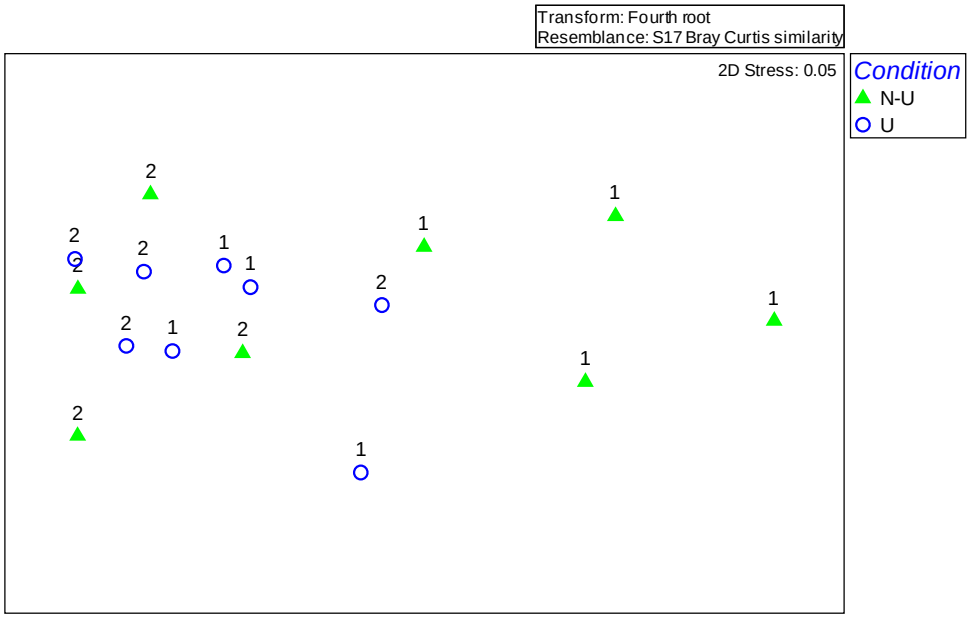


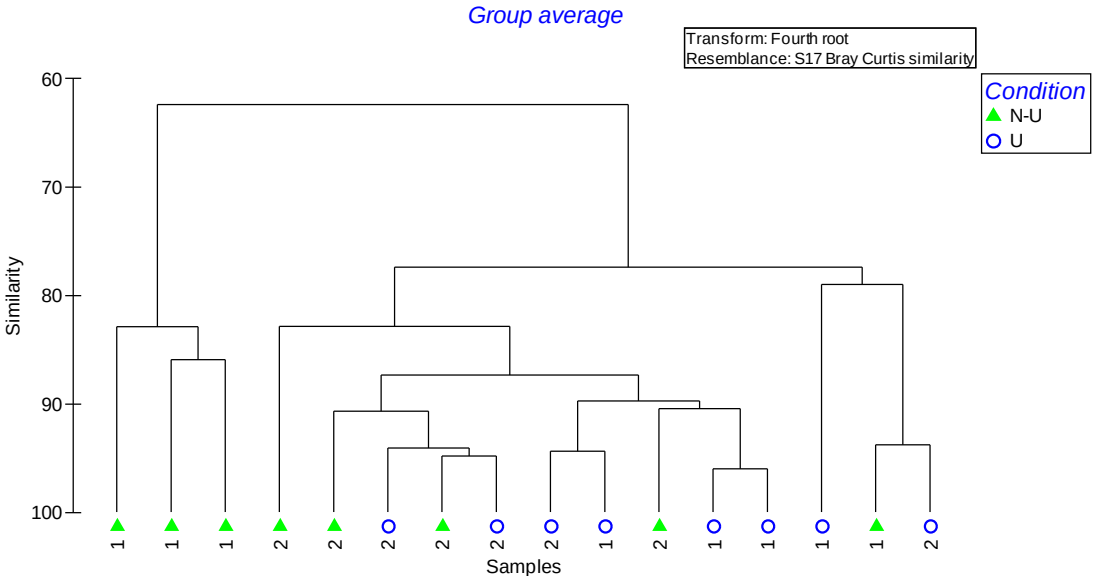
Region B phylum biomass, Y1≠Y2 in NU; U≠NU in Y1; U≠NU in Y2.



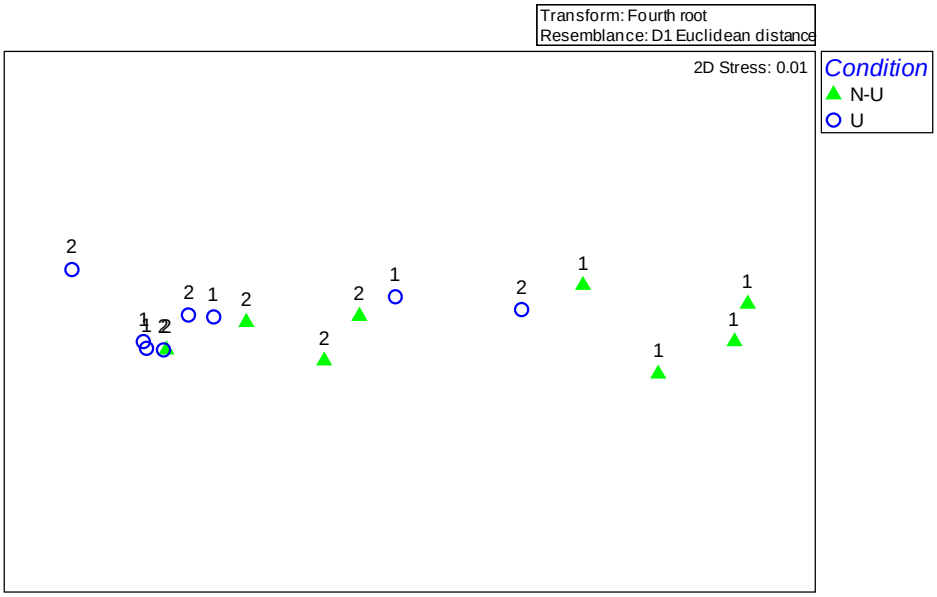


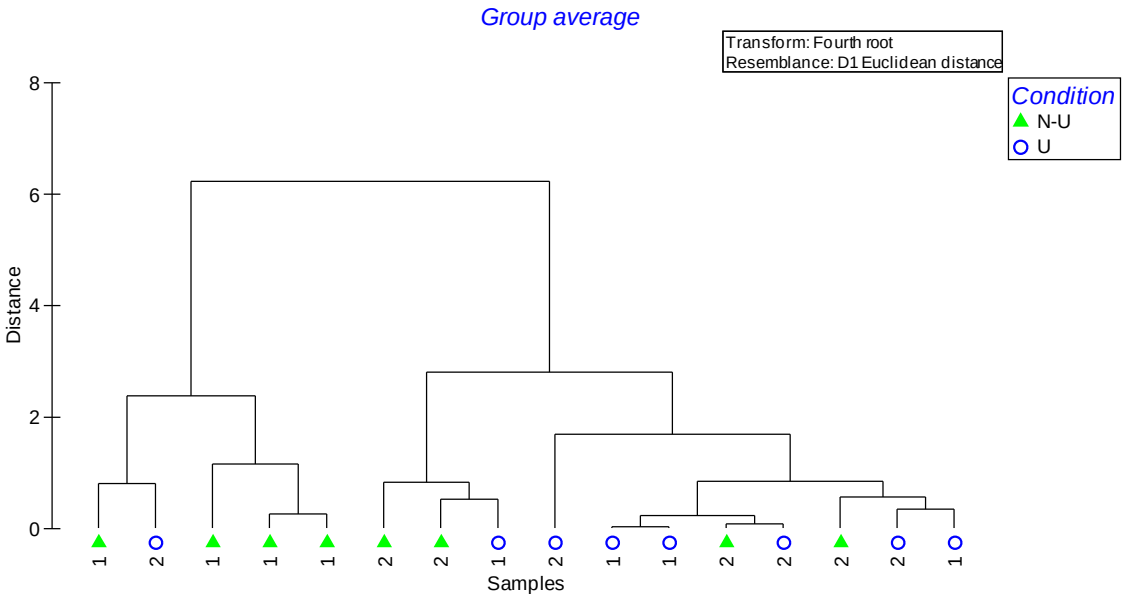
Region A all feeding guilds biomass, Condition.



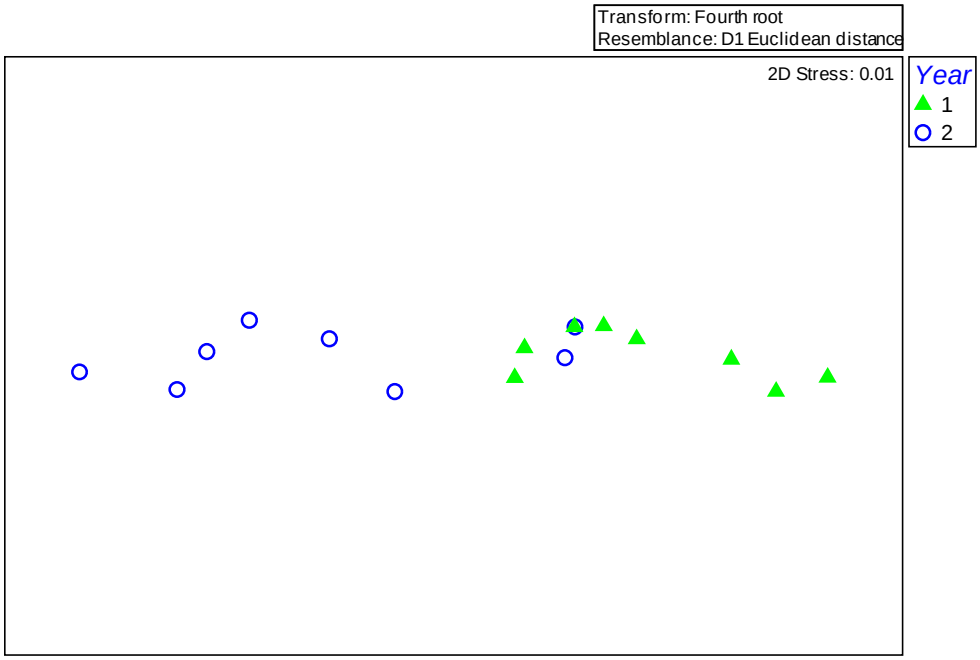


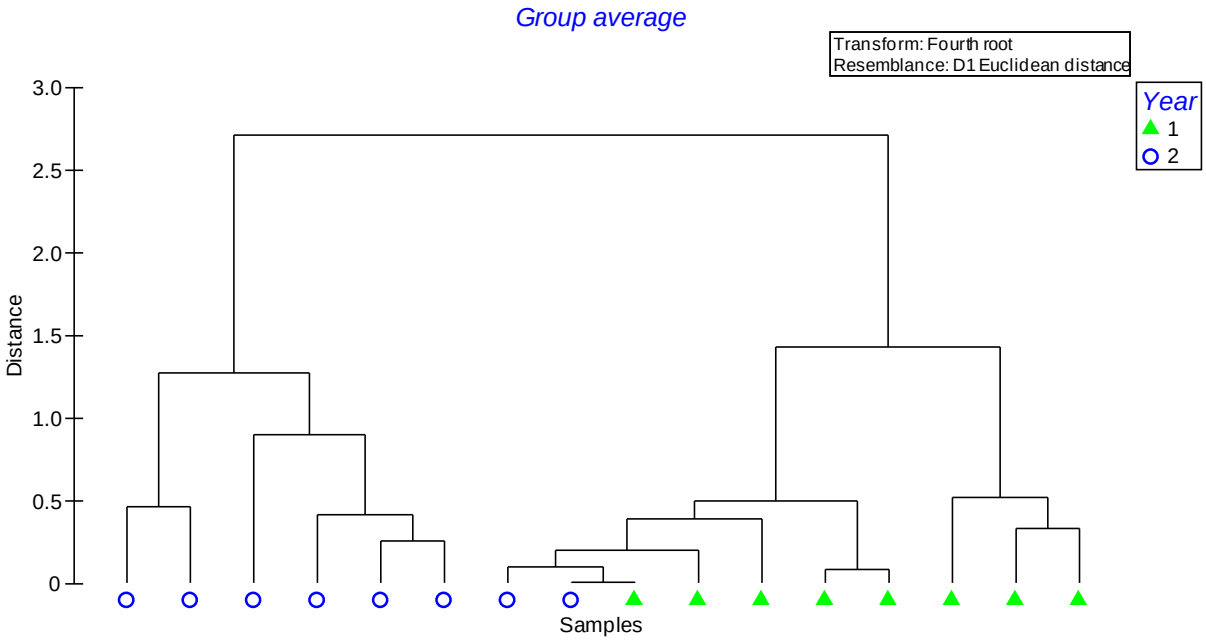
Region B all feeding guilds biomass, U≠NU in Y1; Y1≠Y2 in NU.



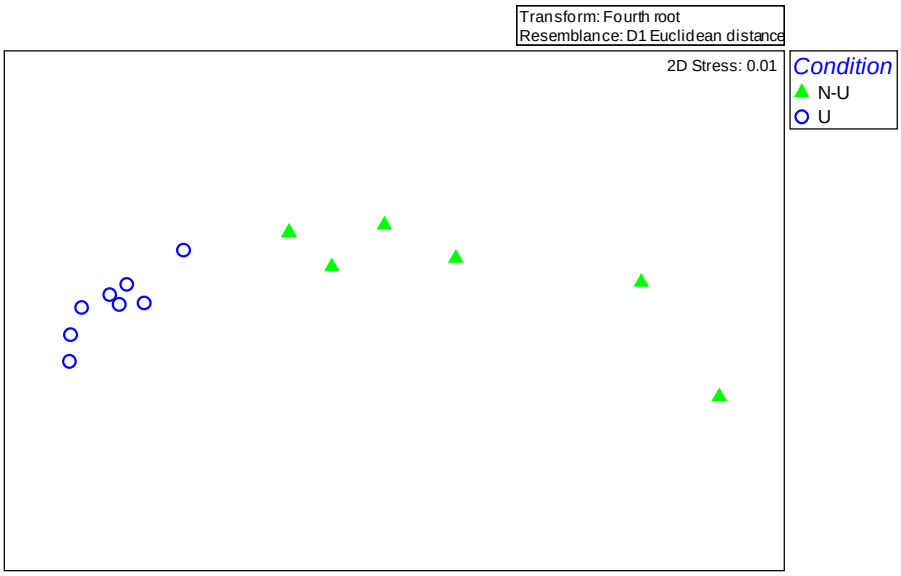


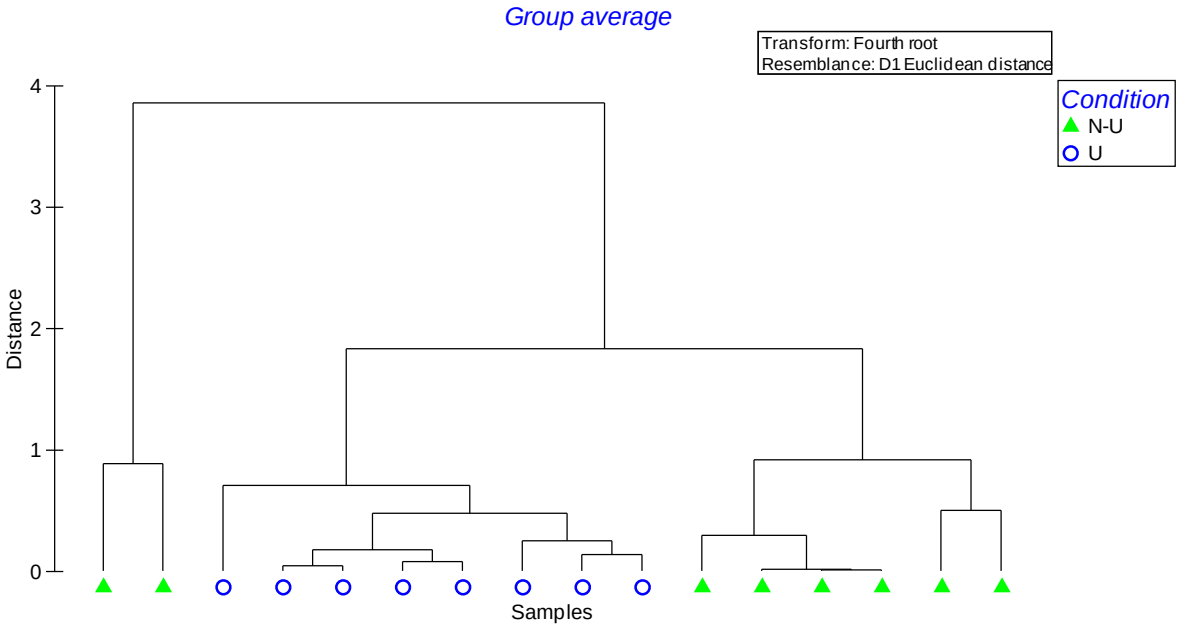
Region B filter feeder biomass, U≠NU in Y1; Y1≠Y2 in NU.



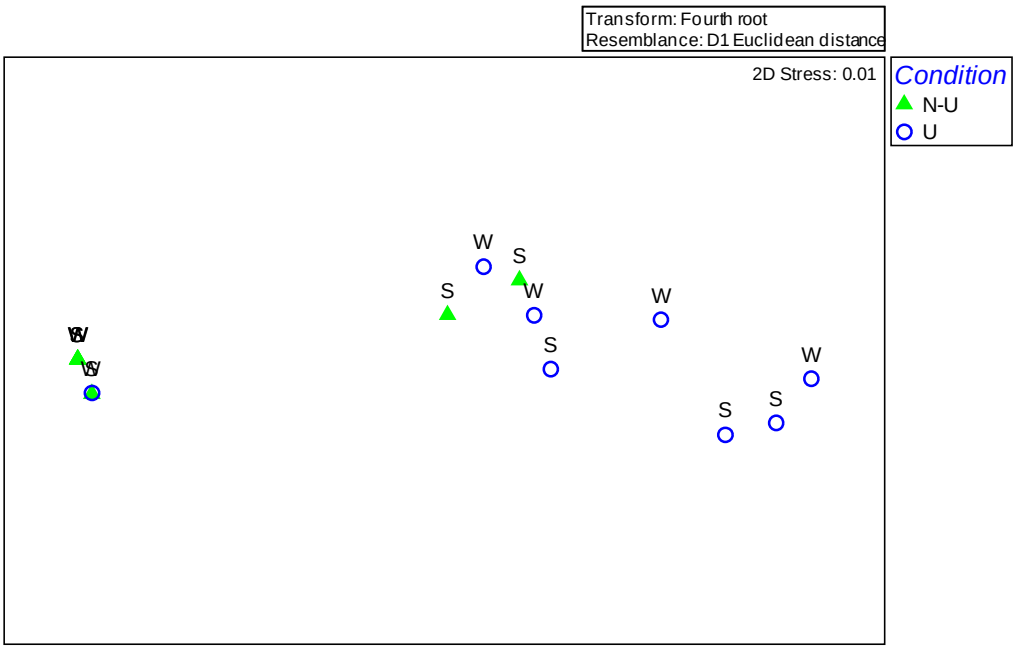


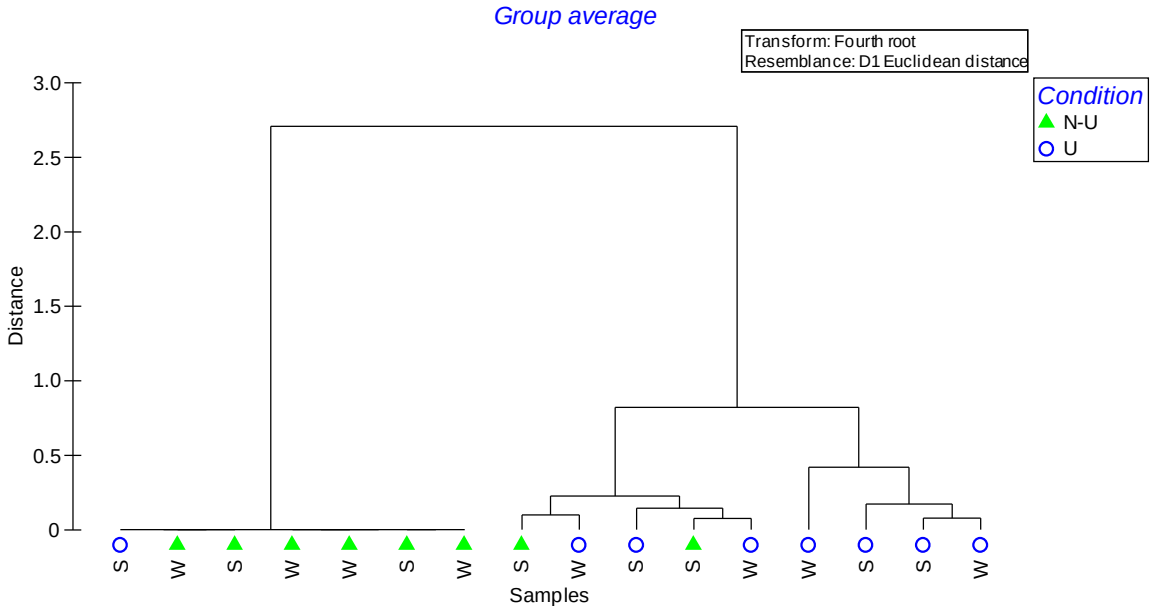
Region B deposit feeder biomass, Year.



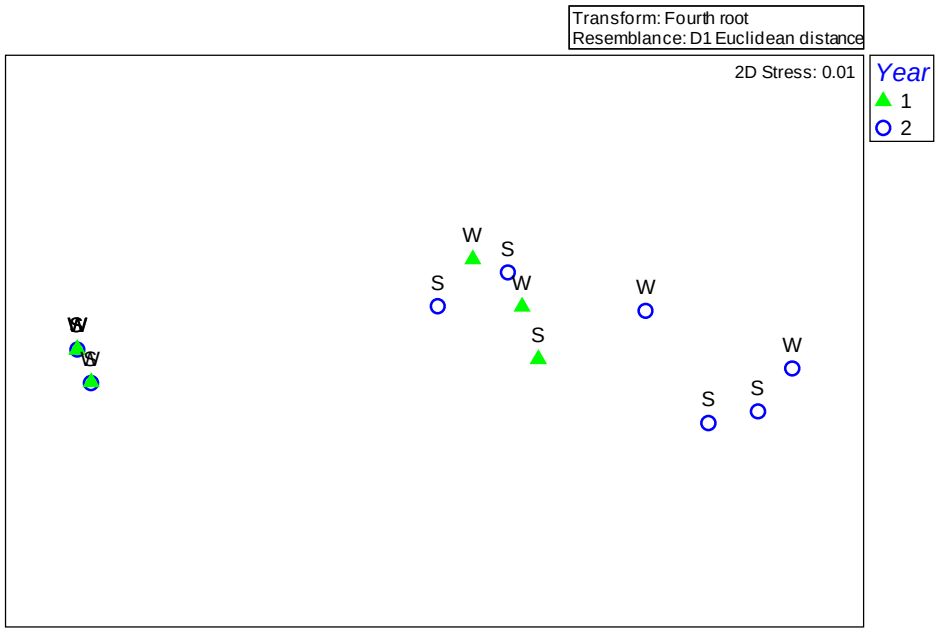


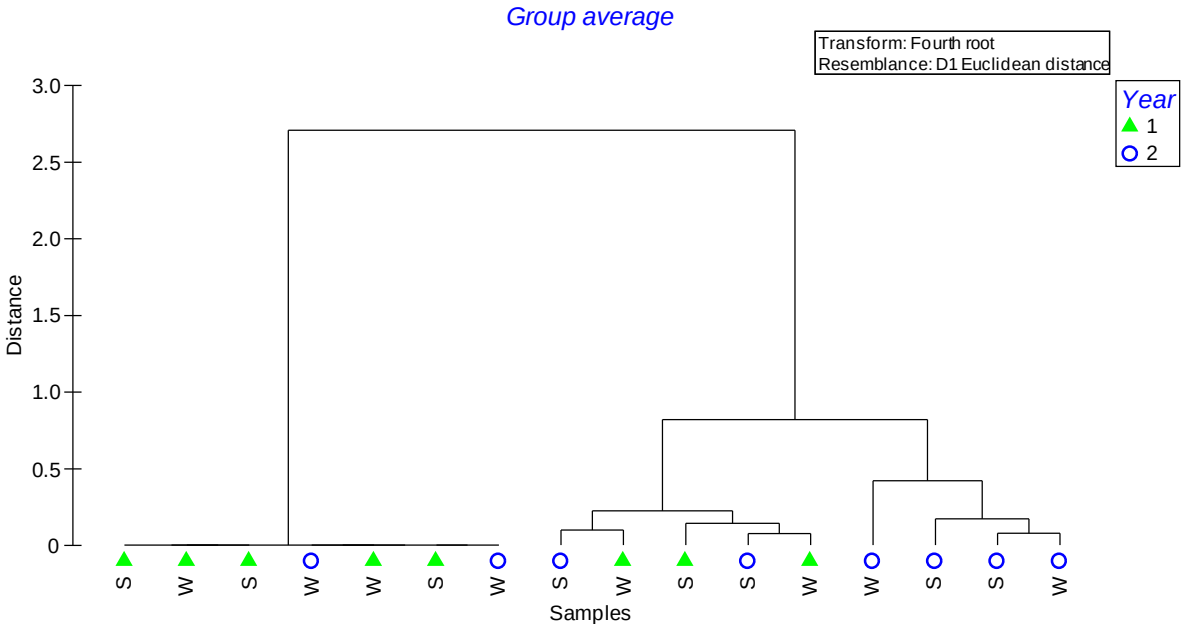
Region A scavenger biomass, Condition.



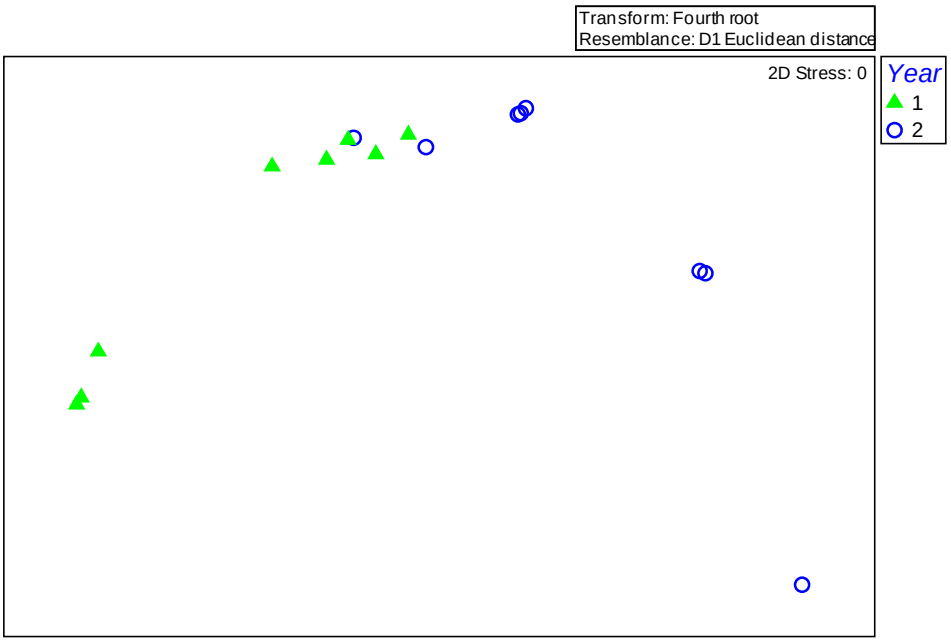


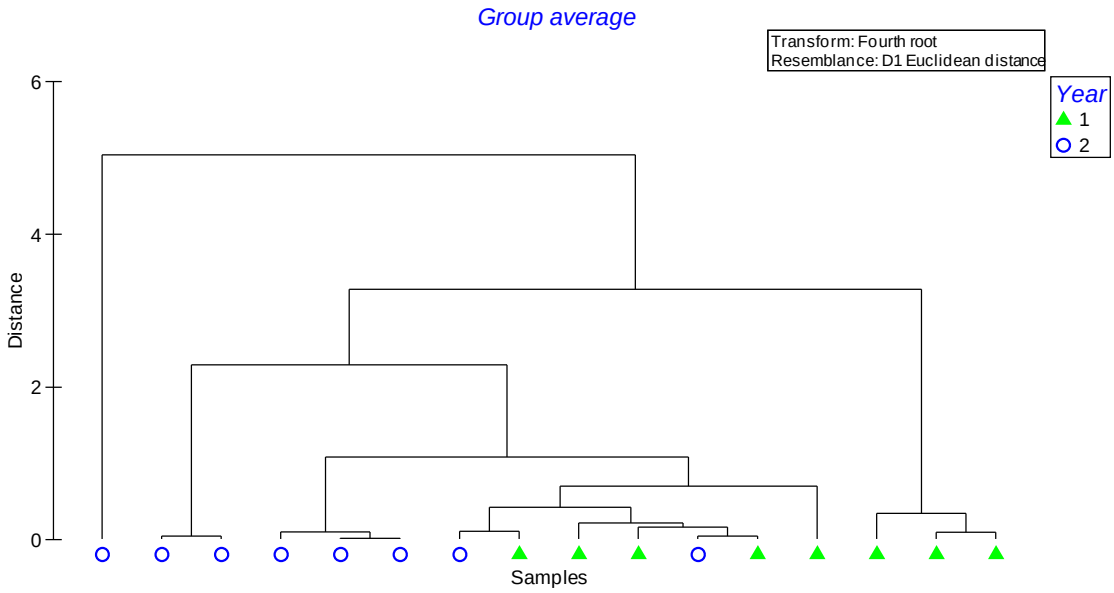
Region A predator biomass,U≠NU in W.



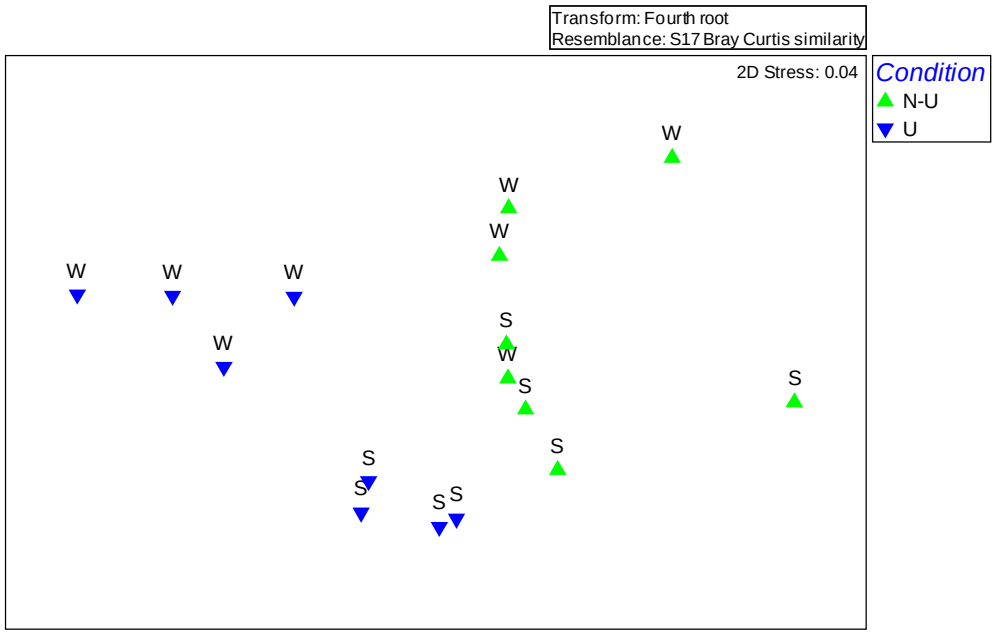


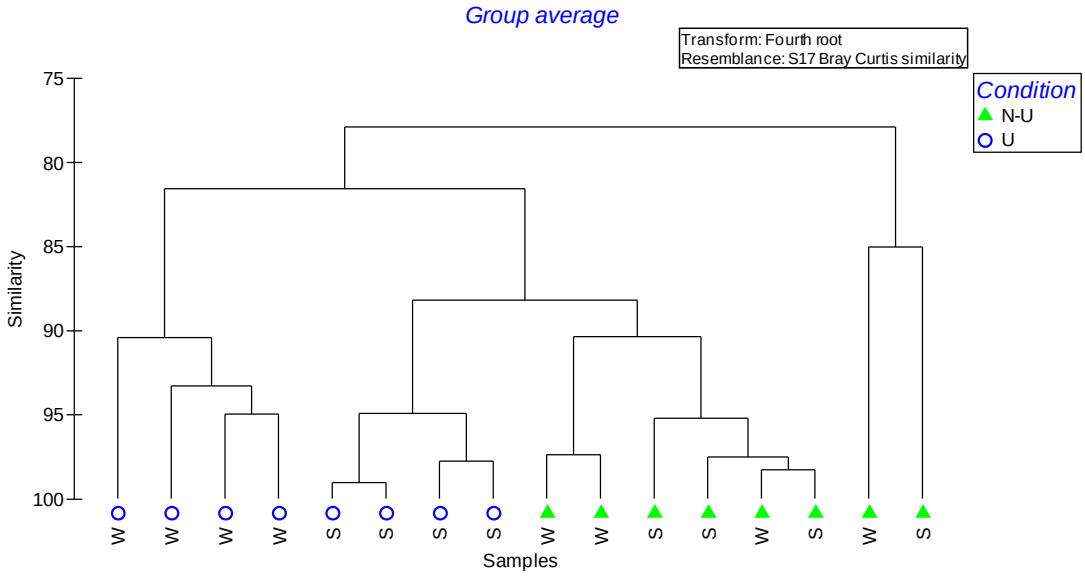
Region A predator biomass, Y1≠Y2 in S.



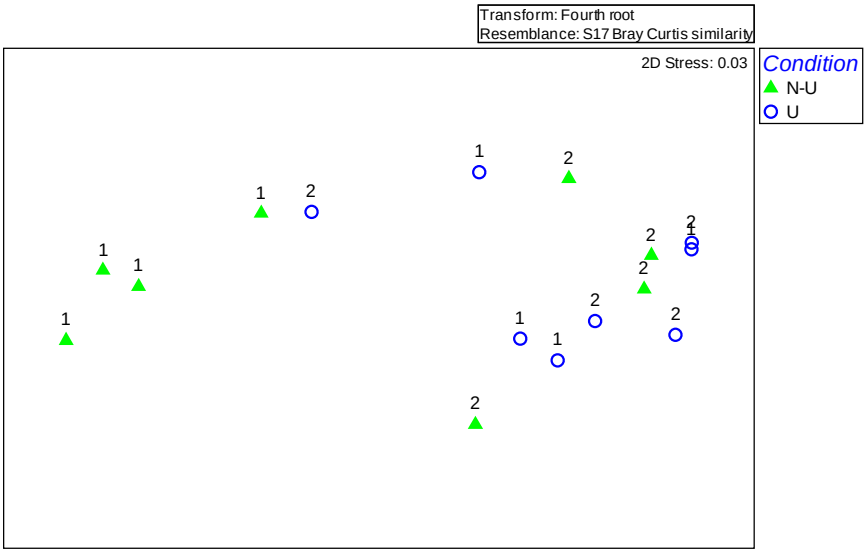


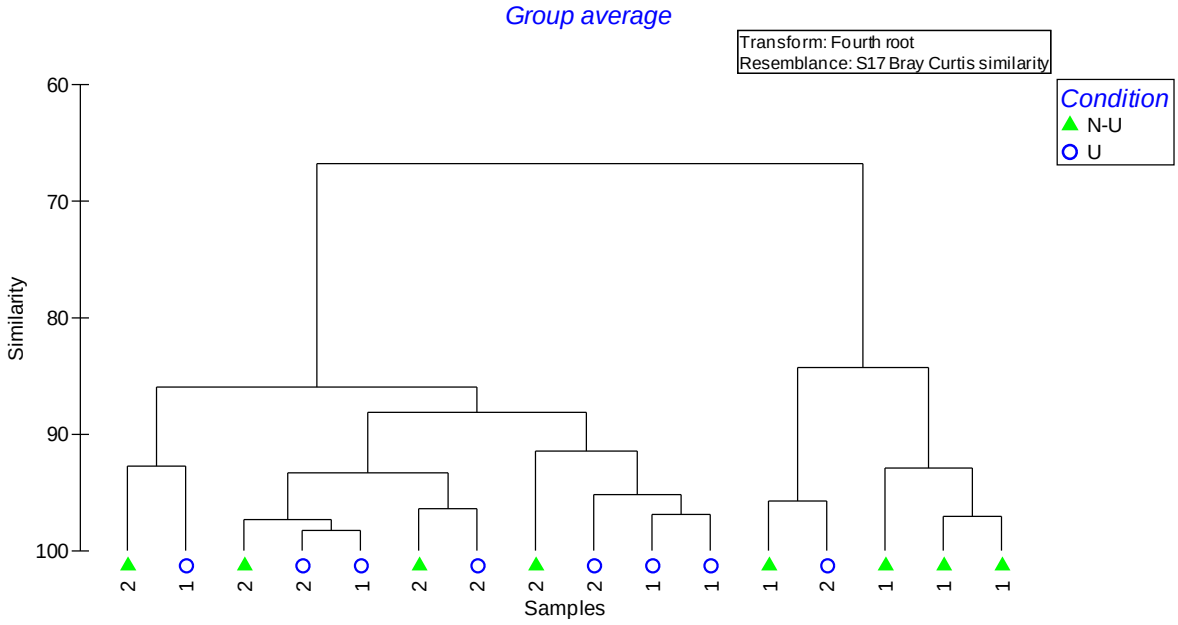
Region B predators, Year.



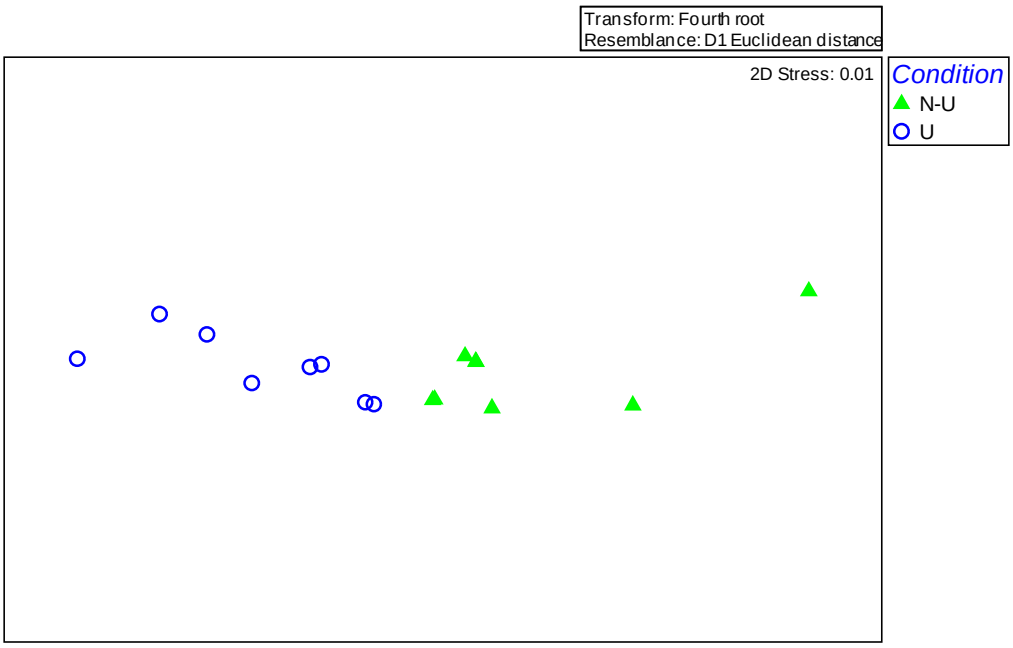


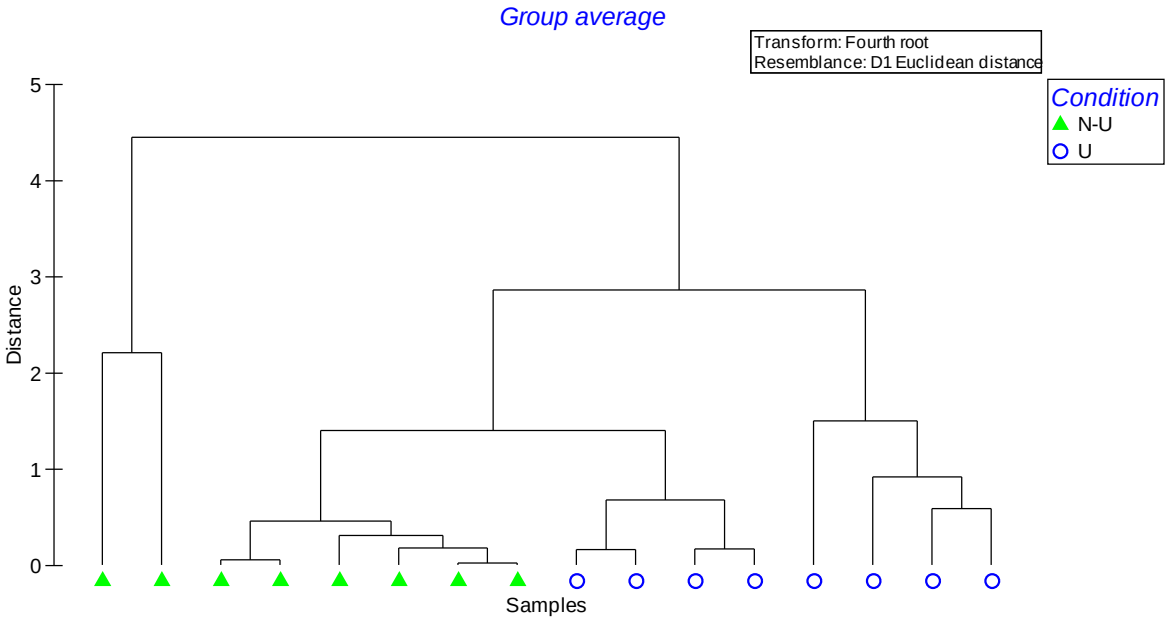
Region A both developmental modes biomass, W≠S in U; U≠NU in S; U≠NU in W.



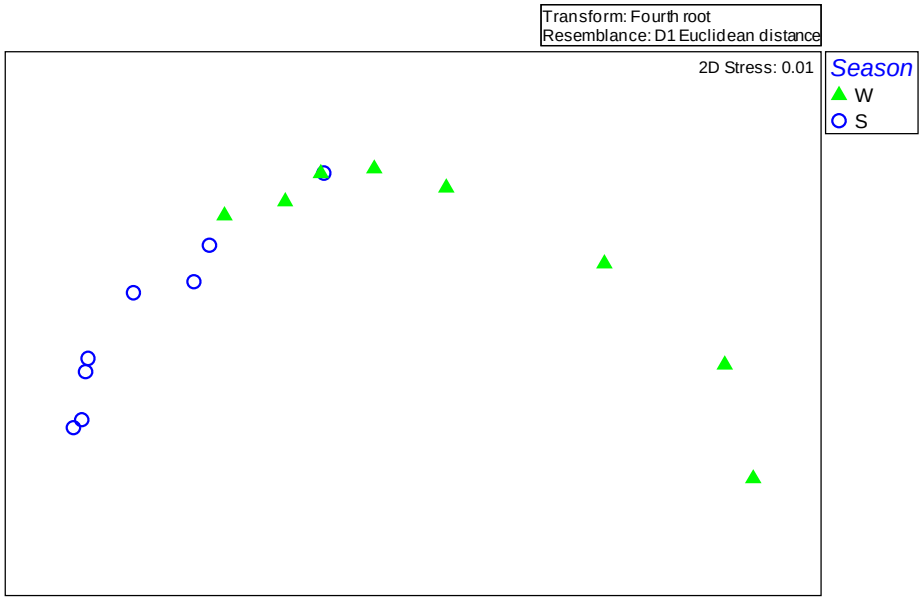


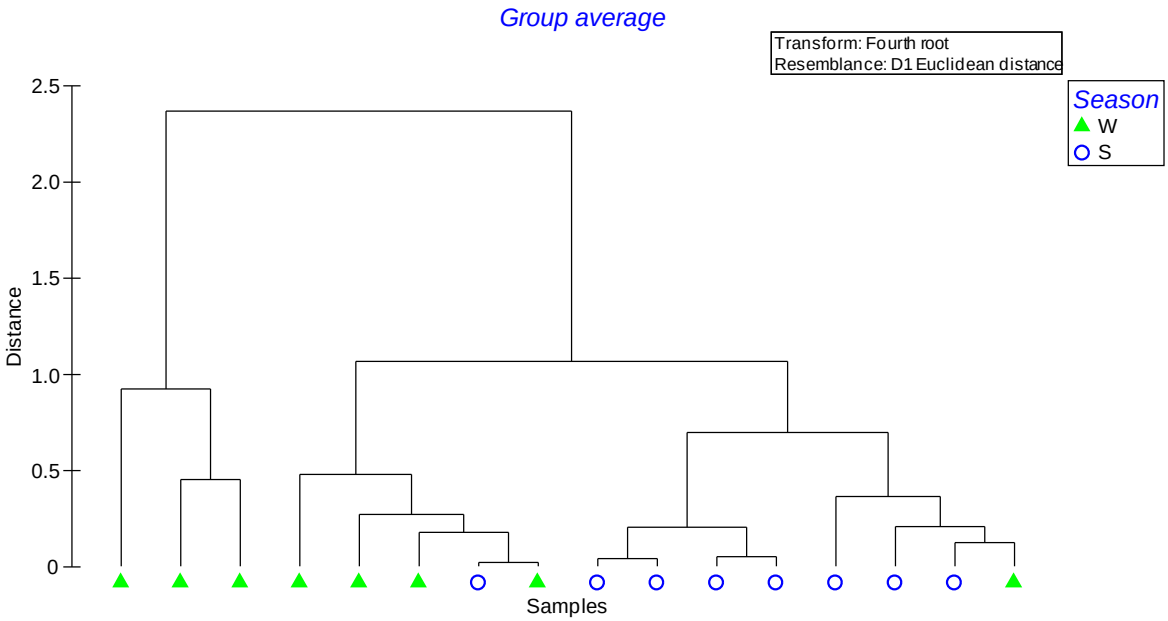
Region B both developmental modes biomass, U≠NU in Y1; Y1≠Y2 in NU



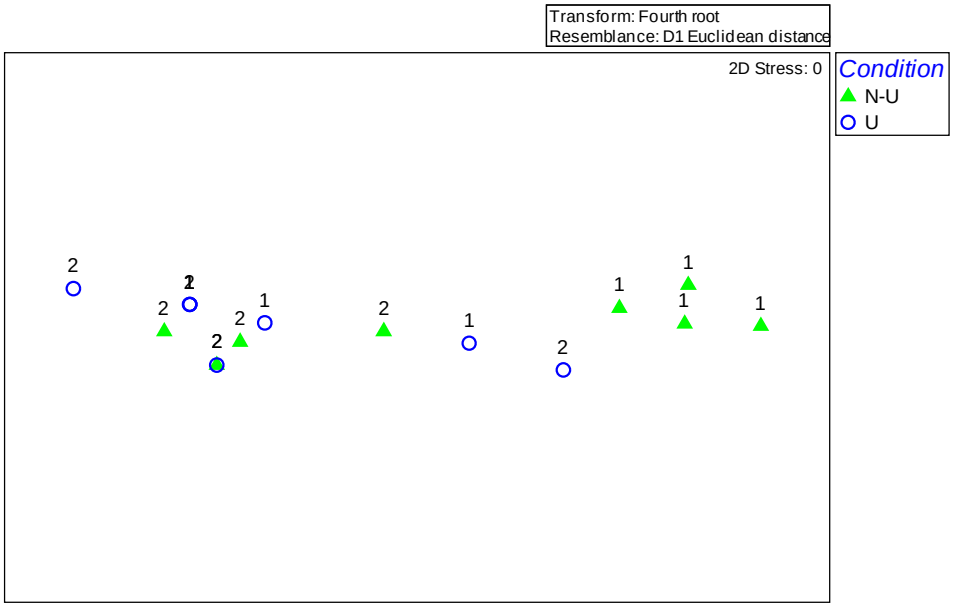


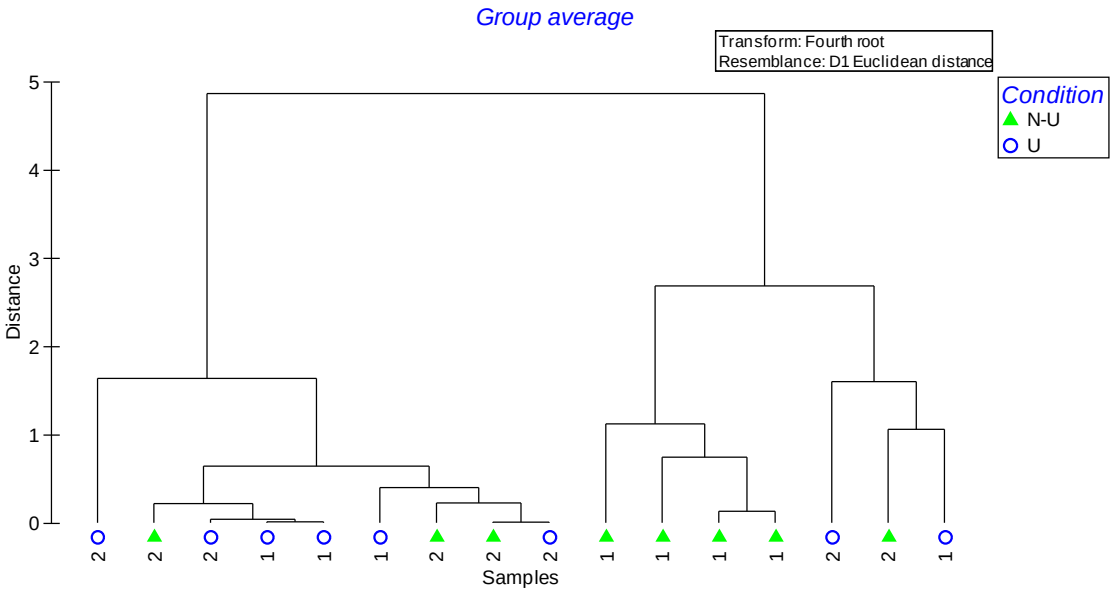
Region A direct developer biomass, Condition.



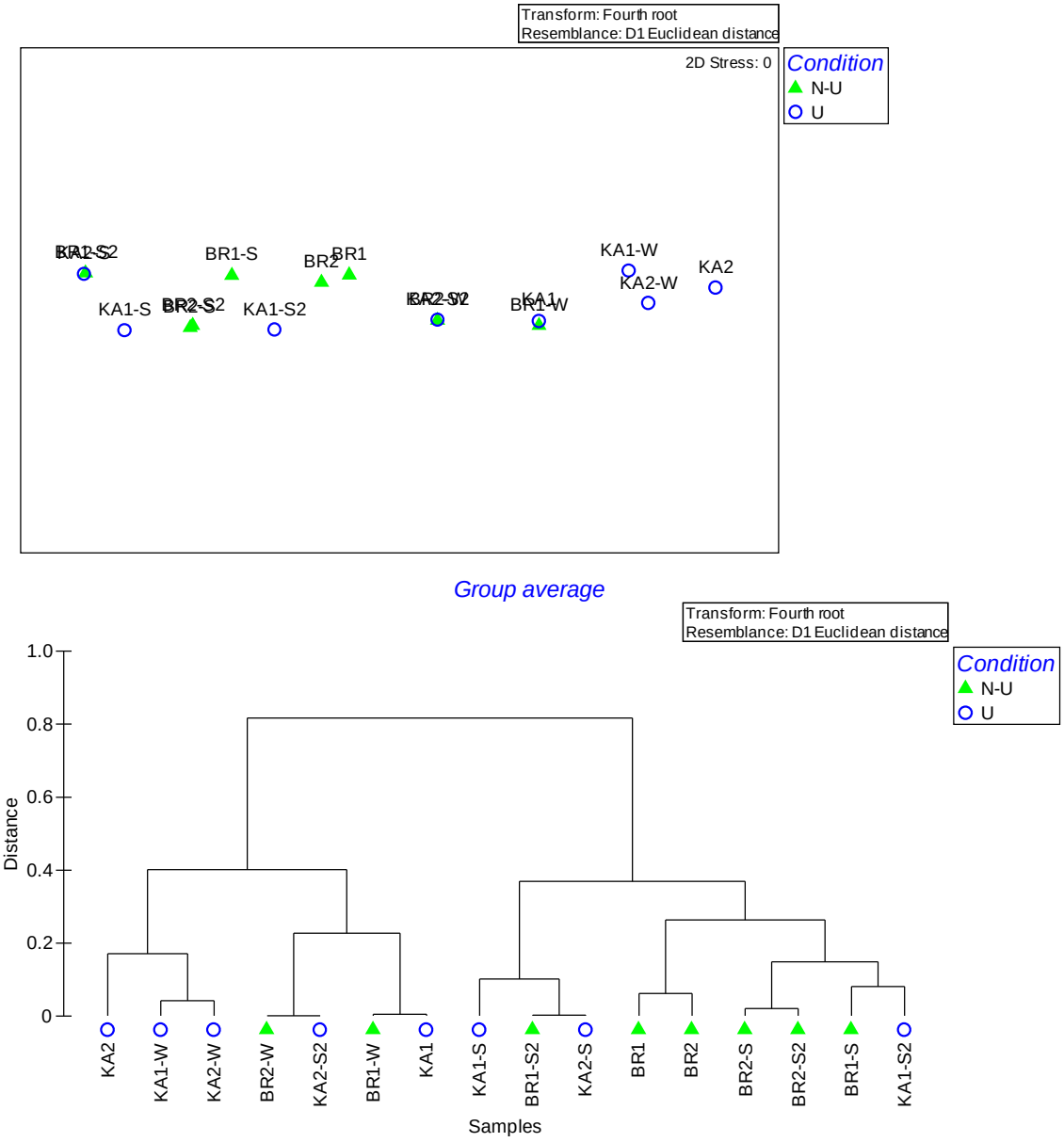


Region A indirect developer biomass, Season.



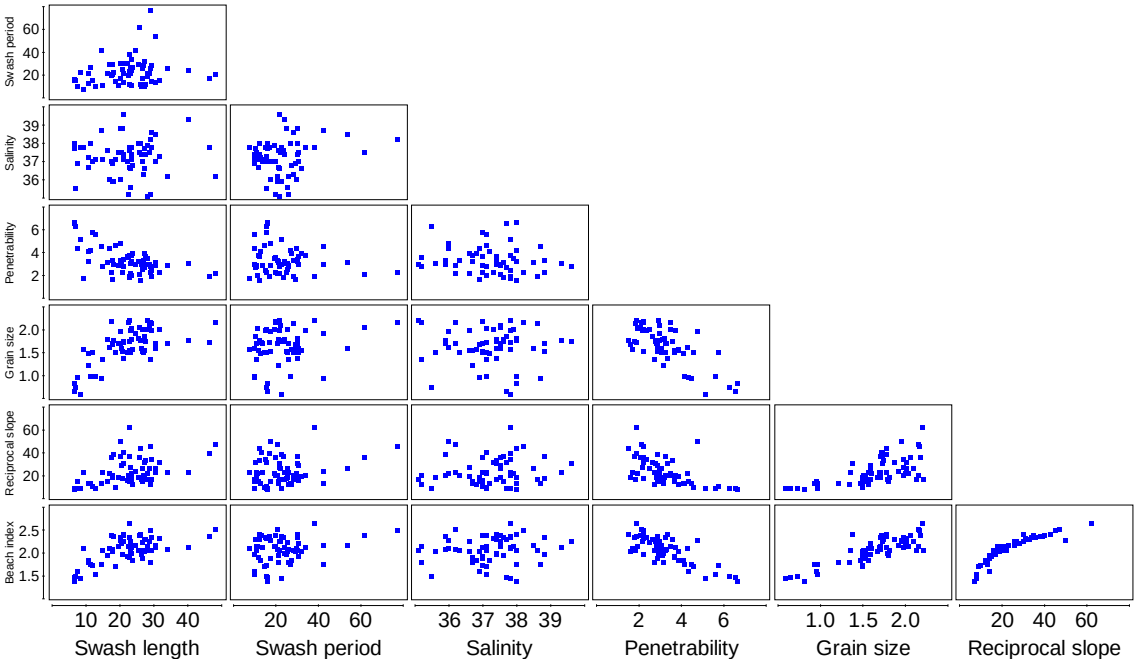


Region B indirect developer biomass, U≠NU in Y1; Y1≠Y2 in NU

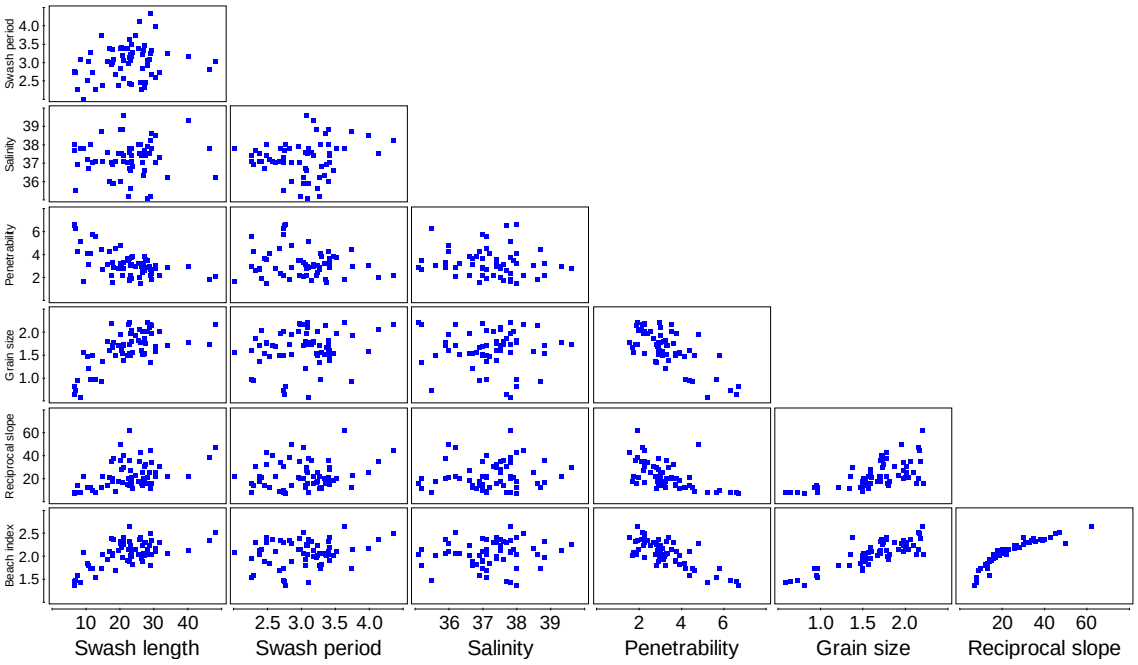


Region D indirect developer biomass. This was a 3-way interaction. KA = Kasouga; BR = Birah. Where there is nothing after the site code it is winter, year 1; S = summer, year 1; W = winter, year 2; S2 = summer year 2. W≠S in NU, Y1; W≠S in NU, Y2; W≠S in U Y2.

Draftsman plots untransformed for PCA and BIO-ENV.



Draftsman plots with swash period log transformed for PCA and BIO-ENV.



Region A BEST test results for abundance

Species untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.731
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
2	0.731	4,5
3	0.715	4,5,7
1	0.714	5
2	0.710	5,7
4	0.682	2,4,5,7
4	0.679	1,4,5,7
3	0.678	1,4,5
3	0.676	4-6
3	0.672	2,4,5
4	0.668	4-7

Species square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity

4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.823
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
2	0.823	4,5
1	0.819	5
3	0.810	4,5,7
2	0.808	5,7
3	0.764	4-6
4	0.758	1,4,5,7
4	0.756	4-7
4	0.755	2,4,5,7
3	0.753	1,4,5
2	0.749	4,7

Species fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.866
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
1	0.866	5
2	0.855	4,5
3	0.822	4,5,7
2	0.812	5,7
3	0.759	4-6
3	0.753	1,4,5
2	0.751	4,7
4	0.750	1,4,5,7
4	0.748	4-7
4	0.738	2,4,5,7

Species log (X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.875
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
1	0.875	5
2	0.870	4,5
3	0.846	4,5,7
2	0.835	5,7
3	0.779	4-6
2	0.777	4,7
4	0.774	1,4,5,7
4	0.773	4-7
4	0.772	2,4,5,7
3	0.771	1,4,5

Order untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.185
Significance level of sample statistic: 49.2%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 491

Best results

No.Vars	Corr.	Selections
2	0.185	5,6
4	0.176	1,2,5,6
5	0.174	1,2,5-7
3	0.164	1,5,6
3	0.162	5-7
3	0.162	2,5,6
4	0.155	2,5-7
3	0.155	1,2,6
2	0.149	5,7
4	0.149	1,2,5,7

Order square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.362
Significance level of sample statistic: 4.3%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 42

Best results

No.Vars	Corr.	Selections
1	0.362	5
2	0.351	5,6
2	0.349	5,7
3	0.327	5-7
2	0.301	1,5
3	0.300	1,5,6
3	0.299	1,5,7
5	0.293	1,2,5-7
4	0.293	2,5-7
3	0.290	4-6

Order fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.602
Significance level of sample statistic: 0.2%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 1

Best results

No.Vars	Corr.	Selections
1	0.602	5
2	0.568	4,5
3	0.511	4,5,7
3	0.511	1,4,5
2	0.502	5,7
2	0.481	1,5
4	0.476	1,4,5,7
3	0.472	4-6
1	0.458	4
2	0.452	5,6

Order log (X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.698
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
1	0.698	5
2	0.665	4,5
2	0.624	5,7
3	0.623	4,5,7
3	0.619	1,4,5
4	0.593	1,4,5,7
2	0.591	1,5
3	0.588	4-6
2	0.572	5,6
3	0.568	1,5,7

Phylum untransformed

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.259
Significance level of sample statistic: 17.2%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 171

Best results

No.Vars	Corr.	Selections
1	0.259	6
2	0.206	6,7
2	0.201	1,6
3	0.181	1,6,7
2	0.155	5,6
3	0.149	1,5,6
3	0.147	5-7
4	0.147	1,5-7
3	0.141	1,4,6
2	0.140	4,6

Phylum square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.358
Significance level of sample statistic: 4.6%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 45

Best results

No.Vars	Corr.	Selections
1	0.358	6
2	0.339	1,6
2	0.332	6,7
3	0.324	1,4,6
3	0.323	1,6,7
2	0.315	5,6
3	0.315	1,5,6
4	0.314	1,4,6,7
4	0.313	1,5-7
2	0.312	4,6

Phylum fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.438
Significance level of sample statistic: 0.2%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 1

Best results

No.Vars	Corr.	Selections
1	0.438	4
2	0.431	4,5
3	0.424	1,4,5
2	0.420	1,4
2	0.416	4,7
3	0.415	4,5,7
3	0.413	4-6
2	0.409	4,6
4	0.408	1,4,5,7
4	0.407	1,4-6

Phylum log (X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.625
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
2	0.625	1,4
3	0.614	1,4,5
4	0.604	1,4-6
3	0.600	1,4,6
3	0.596	1,4,7
4	0.589	1,4,5,7
5	0.583	1,4-7
4	0.574	1,4,6,7
1	0.573	4
2	0.571	1,5

Region B BEST test results for abundance

Species untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.5
Significance level of sample statistic: 0.3%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 2

Best results

No.Vars	Corr.	Selections
3	0.500	1,2,7
2	0.496	1,7
3	0.454	1,4,7
4	0.452	1,2,6,7
4	0.439	1,2,4,7
3	0.438	1,6,7
2	0.416	1,2
2	0.413	1,6
1	0.412	1
3	0.410	1,2,6

Species square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.529
Significance level of sample statistic: 0.4%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 3

Best results

No.Vars	Corr.	Selections
3	0.529	1,2,7
2	0.524	1,7
4	0.518	1,2,4,7
3	0.517	1,4,7
5	0.486	1,2,4,5,7
4	0.479	1,2,6,7
4	0.477	1,4,5,7
6	0.471	1,2,4-7
4	0.470	1,2,5,7
3	0.463	1,6,7

Species fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.549
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
5	0.549	1,2,4,5,7
4	0.547	1,2,4,7
6	0.527	1,2,4-7
3	0.517	1,4,7
4	0.508	1,4,5,7
4	0.503	1,2,4,5
5	0.502	1,2,4-6
3	0.501	1,2,7
5	0.492	1,2,4,6,7
4	0.489	1,2,5,7

Species log(x+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.557
Significance level of sample statistic: 0.2%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 1

Best results

No.Vars	Corr.	Selections
5	0.557	1,2,4,5,7
4	0.554	1,2,4,7
3	0.543	1,4,7
4	0.533	1,4,5,7
6	0.529	1,2,4-7
3	0.520	1,2,7
2	0.514	1,7
4	0.509	1,2,5,7
4	0.506	1,2,4,5
5	0.499	1,2,4-6

Order untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.375
Significance level of sample statistic: 5%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 49

Best results

No.Vars	Corr.	Selections
2	0.375	1,7
1	0.360	1
2	0.338	1,6
3	0.327	1,4,7
3	0.325	1,6,7
3	0.307	1,2,7
2	0.298	1,4
4	0.287	1,4,6,7
3	0.283	1,5,7
4	0.280	1,5-7

Order square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.478
Significance level of sample statistic: 0.8%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 7

Best results

No.Vars	Corr.	Selections
3	0.478	1,4,7
2	0.462	1,7
1	0.451	1
2	0.432	1,4
4	0.420	1,2,4,7
2	0.417	1,6
4	0.416	1,4,5,7
4	0.412	1,4,6,7
3	0.407	1,6,7
3	0.402	1,4,6

Order fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.581
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
3	0.581	1,4,7
4	0.548	1,2,4,7
4	0.541	1,4,5,7
4	0.530	1,4,6,7
6	0.528	1,2,4-7
5	0.527	1,2,4,5,7
5	0.518	1,4-7
4	0.513	1,4-6
3	0.512	1,4,6
5	0.512	1,2,4,6,7

Order log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.603
Significance level of sample statistic: 0.2%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 1

Best results

No.Vars	Corr.	Selections
3	0.603	1,4,7
4	0.557	1,4,5,7
2	0.548	1,4
4	0.542	1,2,4,7
4	0.525	1,4,6,7
3	0.522	1,4,5
3	0.516	1,4,6
5	0.516	1,2,4,5,7
4	0.513	1,4-6
5	0.510	1,4-7

Phylum untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.398
Significance level of sample statistic: 2.2%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 21

Best results

No.Vars	Corr.	Selections
2	0.398	1,7
1	0.374	1
3	0.360	1,4,7
3	0.337	1,6,7
2	0.336	1,6
2	0.335	1,4
4	0.309	1,4,6,7
3	0.295	1,3,7
4	0.291	1,5-7
3	0.291	1,4,6

Phylum square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.557
Significance level of sample statistic: 0.2%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 1

Best results

No.Vars	Corr.	Selections
2	0.557	1,7
1	0.539	1
3	0.538	1,4,7
2	0.502	1,6
2	0.482	1,4
3	0.481	1,6,7
4	0.466	1,4,6,7
3	0.455	1,4,6
3	0.440	1,3,7
4	0.435	1,4,5,7

Phylum fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.571
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
2	0.571	1,7
3	0.566	1,4,7
4	0.559	1,2,4,7
2	0.537	1,6
3	0.535	1,2,7
3	0.522	1,6,7
4	0.520	1,4,6,7
5	0.512	1,2,4,6,7
3	0.503	1,4,6
4	0.501	1,2,6,7

Phylum log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.599
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
3	0.599	1,4,7
2	0.577	1,7
4	0.542	1,2,4,7
2	0.540	1,6
1	0.538	1
4	0.529	1,4,6,7
3	0.520	1,6,7
3	0.515	1,4,6
2	0.509	1,4
4	0.499	1,4,5,7

Region C BEST test results for abundance

Species untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.266
Significance level of sample statistic: 26.6%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 265

Best results

No.Vars	Corr.	Selections
3	0.266	2,3,6
4	0.264	1-3,6
3	0.256	1,2,6
5	0.245	1-3,6,7
4	0.244	1-3,7
2	0.242	2,6
3	0.237	2,3,7
5	0.234	1-4,6
4	0.232	2,3,6,7
3	0.231	1,2,7

Species square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.296
Significance level of sample statistic: 25.2%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 251

Best results

No.Vars	Corr.	Selections
4	0.296	1-3,6
3	0.294	1,2,6
5	0.292	1-3,6,7
3	0.289	2,3,6
4	0.288	1-3,7
2	0.285	2,6
4	0.280	1,2,6,7
3	0.279	1,2,7
5	0.277	1-4,6
2	0.272	2,7

Species fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.323
Significance level of sample statistic: 22.6%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 225

Best results

No.Vars	Corr.	Selections
2	0.323	2,6
2	0.312	2,7
3	0.308	2,6,7
4	0.306	1,2,6,7
5	0.305	1-3,6,7
3	0.305	1,2,6
3	0.299	2,3,6
4	0.292	2,3,6,7
4	0.290	1-3,6
3	0.290	1,2,7

Species log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.282
Significance level of sample statistic: 30.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 300

Best results

No.Vars	Corr.	Selections
4	0.282	1-3,7
3	0.278	1,2,7
3	0.276	1,2,6
4	0.269	1-3,6
5	0.269	1-3,6,7
5	0.269	1-4,7
4	0.267	1,2,6,7
4	0.266	1,2,4,7
5	0.263	1-4,6
4	0.259	1,2,4,6

Order untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.246
Significance level of sample statistic: 33.5%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 334

Best results

No.Vars	Corr.	Selections
4	0.246	1-3,6
3	0.244	2,3,6
3	0.227	1-3
4	0.225	1-3,7
2	0.224	2,3
2	0.220	1,2
4	0.219	1-4
5	0.218	1-4,6
3	0.214	1,2,6
5	0.209	1-3,6,7

Order square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.3
Significance level of sample statistic: 25%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 249

Best results

No.Vars	Corr.	Selections
2	0.300	1,2
4	0.282	1-3,6
3	0.278	1,2,6
3	0.271	1-3
3	0.267	2,3,6
4	0.263	1-4
5	0.261	1-4,6
3	0.257	1,2,4
4	0.254	1-3,7
2	0.254	2,6

Order fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.369
Significance level of sample statistic: 15.5%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 154

Best results

No.Vars	Corr.	Selections
2	0.369	1,2
3	0.359	1,2,6
2	0.331	2,6
4	0.330	1,2,4,6
3	0.329	1,2,4
3	0.321	1,2,7
4	0.310	1-3,6
5	0.304	1-4,6
3	0.301	2,4,6
4	0.301	1,2,4,7

Order log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.334
Significance level of sample statistic: 17.4%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 173

Best results

No.Vars	Corr.	Selections
2	0.334	1,2
3	0.309	1-3
4	0.309	1-4
3	0.297	1,2,4
4	0.288	1-3,6
3	0.280	1,2,6
5	0.276	1-4,6
4	0.269	1-3,7
2	0.263	2,3
3	0.263	2,3,6

Phylum untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.344
Significance level of sample statistic: 7.9%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 78

Best results

No.Vars	Corr.	Selections
4	0.344	1-3,6
4	0.329	1-3,7
3	0.323	2,3,6
5	0.319	1-3,6,7
5	0.317	1-4,6
3	0.305	2,3,7
5	0.298	1-4,7
3	0.294	1,3,6
4	0.294	1-4
3	0.292	1,2,6

Phylum square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.391
Significance level of sample statistic: 4.7%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 46

Best results

No.Vars	Corr.	Selections
4	0.391	1-3,6
4	0.385	1-3,7
3	0.385	1,2,6
5	0.382	1-4,6
4	0.377	1,2,4,6
5	0.375	1-3,6,7
3	0.372	1,2,7
5	0.372	1-4,7
3	0.370	1,2,4
4	0.367	1,2,4,7

Phylum fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.462
Significance level of sample statistic: 2.6%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 25

Best results

No.Vars	Corr.	Selections
3	0.462	1,2,4
4	0.419	1,2,4,7
2	0.415	1,2
4	0.405	1,2,4,6
3	0.398	1,2,7
3	0.390	1,2,6
5	0.373	1,2,4,6,7
4	0.366	1-4
4	0.366	1,2,6,7
5	0.360	1-4,7

Phylum log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.42
Significance level of sample statistic: 3.2%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 31

Best results

No.Vars	Corr.	Selections
3	0.420	1,2,4
2	0.389	1,2
4	0.387	1,2,4,7
4	0.379	1-4
3	0.378	1,2,7
4	0.377	1,2,4,6
3	0.371	1,2,6
5	0.365	1-4,7
5	0.358	1-4,6
4	0.357	1-3,7

Region D BEST test results for abundance

Species untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.341
Significance level of sample statistic: 5%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 49

Best results

No.Vars	Corr.	Selections
4	0.341	1-3,5
3	0.338	2,3,5
3	0.327	1,3,5
2	0.318	3,5
5	0.303	1-5
5	0.303	1-3,5,7
4	0.289	1,3-5
3	0.288	1-3
4	0.286	1,3,5,7
4	0.284	2-5

Species square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.338
Significance level of sample statistic: 7.5%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 74

Best results

No.Vars	Corr.	Selections
2	0.338	1,4
4	0.316	1,3-5
3	0.310	1,4,5
3	0.307	1,3,4
1	0.303	1
2	0.294	1,3
5	0.293	1,3-5,7
3	0.293	1,4,7
5	0.289	1,3-6
3	0.288	1,3,5

Species fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.337
Significance level of sample statistic: 7.7%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 76

Best results

No.Vars	Corr.	Selections
2	0.337	1,4
1	0.319	1
3	0.283	1,4,7
3	0.282	1,3,4
3	0.279	1,4,5
2	0.278	1,3
3	0.273	1,4,6
2	0.260	1,6
4	0.260	1,3-5
4	0.256	1,4,5,7

Species log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.345
Significance level of sample statistic: 7.8%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 77

Best results

No.Vars	Corr.	Selections
2	0.345	1,4
4	0.320	1,3-5
3	0.316	1,3,4
3	0.316	1,4,7
3	0.315	1,4,5
5	0.307	1,3-5,7
1	0.306	1
4	0.302	1,4,5,7
5	0.301	1,3-6
4	0.297	1,3,4,7

Order untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.209
Significance level of sample statistic: 39.7%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 396

Best results

No.Vars	Corr.	Selections
4	0.209	1-3,5
3	0.202	1,3,5
3	0.198	2,3,5
5	0.198	1-3,5,7
2	0.197	1,5
3	0.194	1,2,5
4	0.194	1,3,5,7
1	0.185	1
4	0.177	1,3,5,6
5	0.175	1-3,5,6

Order square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.124
Significance level of sample statistic: 69.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 690

Best results

No.Vars	Corr.	Selections
4	0.124	3,5-7
5	0.123	1,3,5-7
4	0.112	1,3,6,7
6	0.105	1,3-7
5	0.105	3-7
3	0.105	3,6,7
3	0.103	3,5,6
5	0.100	1,3-6
4	0.100	1,3,5,6
2	0.099	3,7

Order fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.056
Significance level of sample statistic: 89.3%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 892

Best results

No.Vars	Corr.	Selections
1	0.056	6
3	0.053	3,6,7
2	0.050	3,7
2	0.050	6,7
2	0.036	3,6
4	0.033	3,4,6,7
4	0.031	3,5-7
1	0.025	7
5	0.022	3-7
3	0.022	3,4,6

Order log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.122
Significance level of sample statistic: 70.3%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 702

Best results

No.Vars	Corr.	Selections
2	0.122	6,7
1	0.118	6
3	0.114	1,6,7
3	0.114	1,4,6
4	0.114	1,4,6,7
3	0.112	1,4,7
1	0.110	7
4	0.107	3,5-7
4	0.107	1,3,6,7
6	0.107	1,3-7

Phylum untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.377
Significance level of sample statistic: 1.7%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 16

Best results

No.Vars	Corr.	Selections
3	0.377	1,4,5
4	0.362	1,3-5
2	0.354	4,5
3	0.350	3-5
1	0.336	5
4	0.314	1,4,5,7
1	0.310	4
3	0.308	1,3,5
5	0.307	1,3-5,7
2	0.301	1,5

Phylum square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.386
Significance level of sample statistic: 3.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 30

Best results

No.Vars	Corr.	Selections
4	0.386	1,3-5
3	0.381	3-5
3	0.363	1,4,5
5	0.337	1,3-5,7
2	0.330	4,5
4	0.329	3-5,7
4	0.309	1,4,5,7
2	0.306	1,4
5	0.304	1,3-6
3	0.302	1,3,4

Phylum fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.244
Significance level of sample statistic: 28.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 280

Best results

No.Vars	Corr.	Selections
3	0.244	3-5
4	0.225	1,3-5
3	0.220	1,3,4
4	0.193	3-5,7
2	0.189	3,4
5	0.183	1,3-5,7
4	0.179	3-6
2	0.169	1,4
3	0.163	1,4,5
2	0.162	3,5

Phylum log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.299
Significance level of sample statistic: 16.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 160

Best results

No.Vars	Corr.	Selections
4	0.299	1,3-5
3	0.295	3-5
5	0.271	1,3-5,7
4	0.265	3-5,7
3	0.253	1,4,5
3	0.251	1,3,4
4	0.241	3-6
5	0.240	1,3-6
4	0.225	1,4,5,7
5	0.225	1-5

Region A BEST test results for biomass

Species untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.726
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
4	0.726	3-5,7
3	0.709	3-5
4	0.697	3-6
3	0.697	3,5,7
5	0.696	3-7
1	0.694	5
2	0.689	4,5
5	0.670	1,3-5,7
3	0.663	4,5,7
3	0.661	3,4,7

Species square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.757
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
2	0.757	4,5
1	0.753	5
4	0.744	3-5,7
3	0.738	4,5,7
5	0.722	3-7
2	0.718	5,7
4	0.712	3-6
3	0.711	3-5
3	0.710	4-6
2	0.705	4,7

Species fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.802
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
1	0.802	5
2	0.797	4,5
3	0.774	4,5,7
2	0.757	5,7
4	0.745	3-5,7
3	0.736	4-6
2	0.730	4,7
4	0.724	4-7
4	0.722	1,4,5,7
5	0.721	3-7

Species log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.783
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
2	0.783	4,5
1	0.783	5
3	0.773	4,5,7
2	0.757	5,7
3	0.744	4-6
2	0.739	4,7
4	0.735	4-7
4	0.731	1,4,5,7
4	0.729	3-5,7
3	0.725	1,4,5

Oder untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.705
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
1	0.705	5
3	0.636	3,5,7
2	0.626	3,5
4	0.615	3-5,7
3	0.610	3,5,6
2	0.609	5,7
3	0.609	3-5
2	0.606	4,5
4	0.603	1,3,5,7
4	0.602	3-6

Order square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.712
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
1	0.712	5
2	0.636	4,5
3	0.635	3,5,7
4	0.631	3-5,7
2	0.629	5,7
3	0.622	3-5
4	0.620	3-6
5	0.616	1,3-5,7
4	0.615	1,3-5
3	0.609	3,5,6

Order fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.654
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
1	0.654	5
2	0.617	4,5
3	0.612	3-5
4	0.604	3-5,7
4	0.601	1,3-5
4	0.587	3-6
5	0.587	1,3-5,7
3	0.580	3,5,7
3	0.571	4,5,7
3	0.568	1,4,5

Order log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.586
Significance level of sample statistic: 0.2%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 1

Best results

No.Vars	Corr.	Selections
1	0.586	5
2	0.559	4,5
3	0.554	3-5
4	0.553	3-5,7
4	0.541	3-6
4	0.536	1,3-5
5	0.531	1,3-5,7
3	0.527	4,5,7
5	0.526	3-7
3	0.524	3,5,7

Phylum untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.259
Significance level of sample statistic: 17.2%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 171

Best results

No.Vars	Corr.	Selections
1	0.259	6
2	0.206	6,7
2	0.201	1,6
3	0.181	1,6,7
2	0.155	5,6
3	0.149	1,5,6
3	0.147	5-7
4	0.147	1,5-7
3	0.141	1,4,6
2	0.140	4,6

Phylum square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.358
Significance level of sample statistic: 4.6%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 45

Best results

No.Vars	Corr.	Selections
1	0.358	6
2	0.339	1,6
2	0.332	6,7
3	0.324	1,4,6
3	0.323	1,6,7
2	0.315	5,6
3	0.315	1,5,6
4	0.314	1,4,6,7
4	0.313	1,5-7
2	0.312	4,6

Phylum fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.626
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
3	0.626	3-5
1	0.617	5
4	0.608	3-5,7
2	0.598	4,5
2	0.596	3,5
4	0.594	3-6
4	0.592	1,3-5
3	0.589	3,5,7
5	0.573	1,3-5,7
5	0.569	3-7

Phylum log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.625
Significance level of sample statistic: 0.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 0

Best results

No.Vars	Corr.	Selections
2	0.625	1,4
3	0.614	1,4,5
4	0.604	1,4-6
3	0.600	1,4,6
3	0.596	1,4,7
4	0.589	1,4,5,7
5	0.583	1,4-7
4	0.574	1,4,6,7
1	0.573	4
2	0.571	1,5

Region B BEST test results for biomass

Species untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.324
Significance level of sample statistic: 19.4%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 193

Best results

No.Vars	Corr.	Selections
1	0.324	1
2	0.318	1,6
3	0.311	1,2,7
2	0.309	1,7
3	0.308	1,2,6
4	0.306	1,2,6,7
3	0.292	1,6,7
3	0.289	1,4,7
4	0.285	1,4,6,7
3	0.283	1,4,6

Species square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.483
Significance level of sample statistic: 3%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 29

Best results

No.Vars	Corr.	Selections
3	0.483	1,2,7
4	0.445	1,2,6,7
3	0.431	1,2,6
4	0.414	1,2,4,7
2	0.412	1,7
2	0.411	1,2
4	0.405	1,2,5,7
5	0.396	1,2,5-7
5	0.391	1,2,4,6,7
4	0.388	1,2,5,6

Species fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.558
Significance level of sample statistic: 0.8%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 7

Best results

No.Vars	Corr.	Selections
3	0.558	1,2,7
4	0.520	1,2,6,7
4	0.518	1,2,5,7
4	0.512	1,2,4,7
5	0.500	1,2,5-7
4	0.499	1,2,5,6
3	0.497	1,2,6
5	0.489	1,2,4,5,7
6	0.485	1,2,4-7
5	0.477	1,2,4,6,7

Species log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.582
Significance level of sample statistic: 0.6%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 5

Best results

No.Vars	Corr.	Selections
3	0.582	1,2,7
4	0.556	1,2,5,7
4	0.540	1,2,6,7
5	0.532	1,2,5-7
4	0.529	1,2,5,6
4	0.528	1,2,4,7
5	0.518	1,2,4,5,7
3	0.511	1,2,6
6	0.510	1,2,4-7
3	0.505	1,2,5

Order untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.327
Significance level of sample statistic: 21.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 210

Best results

No.Vars	Corr.	Selections
1	0.327	1
2	0.321	1,6
2	0.307	1,7
3	0.306	1,2,6
3	0.305	1,2,7
4	0.300	1,2,6,7
3	0.291	1,6,7
3	0.290	1,4,7
3	0.288	1,4,6
4	0.287	1,4,6,7

Order square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.444
Significance level of sample statistic: 6.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 60

Best results

No.Vars	Corr.	Selections
3	0.444	1,2,7
4	0.417	1,2,6,7
3	0.417	1,2,6
4	0.397	1,2,4,7
2	0.396	1,7
2	0.387	1,2
5	0.380	1,2,4,6,7
1	0.379	1
2	0.377	1,6
4	0.365	1,2,5,6

Order fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.564
Significance level of sample statistic: 1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 9

Best results

No.Vars	Corr.	Selections
3	0.564	1,2,7
4	0.543	1,2,4,7
4	0.542	1,2,6,7
3	0.526	1,2,6
5	0.520	1,2,5-7
5	0.519	1,2,4,6,7
4	0.517	1,2,5,6
4	0.517	1,2,5,7
6	0.516	1,2,4-7
5	0.507	1,2,4,5,7

Order log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.599
Significance level of sample statistic: 0.5%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 4

Best results

No.Vars	Corr.	Selections
3	0.599	1,2,7
4	0.590	1,2,4,7
4	0.582	1,2,5,7
5	0.581	1,2,4,5,7
6	0.574	1,2,4-7
5	0.573	1,2,5-7
4	0.571	1,2,6,7
4	0.570	1,2,5,6
5	0.553	1,2,4,6,7
5	0.549	1,2,4-6

Phylum untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.351
Significance level of sample statistic: 15.4%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 153

Best results

No.Vars	Corr.	Selections
1	0.351	1
2	0.340	1,6
2	0.320	1,7
3	0.315	1,4,7
3	0.308	1,4,6
4	0.308	1,4,6,7
3	0.305	1,6,7
3	0.295	1,2,6
4	0.289	1,2,6,7
3	0.288	1,2,7

Phylum square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.385
Significance level of sample statistic: 12.8%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 127

Best results

No.Vars	Corr.	Selections
1	0.385	1
2	0.365	1,6
2	0.352	1,7
3	0.352	1,2,6
3	0.351	1,2,7
4	0.342	1,2,6,7
3	0.337	1,4,7
4	0.334	1,2,4,7
3	0.327	1,6,7
5	0.325	1,2,4,6,7

Phylum fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.468
Significance level of sample statistic: 5%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 49

Best results

No.Vars	Corr.	Selections
3	0.468	1,2,7
3	0.467	1,2,6
4	0.456	1,2,6,7
4	0.454	1,2,4,7
5	0.439	1,2,4,6,7
4	0.427	1,2,4,6
2	0.418	1,2
2	0.400	1,6
3	0.389	1,2,4
2	0.389	1,7

Phylum log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.546
Significance level of sample statistic: 2.2%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 21

Best results

No.Vars	Corr.	Selections
4	0.546	1,2,4,7
3	0.536	1,2,7
3	0.527	1,2,6
4	0.516	1,2,6,7
5	0.515	1,2,4,6,7
4	0.502	1,2,4,6
2	0.480	1,2
3	0.475	1,2,4
6	0.458	1,2,4-7
5	0.447	1,2,4,5,7

Region C BEST test results for biomass

Species untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.172
Significance level of sample statistic: 64.4%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 643

Best results

No.Vars	Corr.	Selections
2	0.172	2,5
3	0.163	2,5,6
2	0.149	2,6
1	0.124	2
3	0.123	2,3,6
1	0.120	5
4	0.116	2,3,5,6
4	0.111	2,5-7
3	0.107	2,6,7
2	0.105	2,7

Species square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.182
Significance level of sample statistic: 58.4%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 583

Best results

No.Vars	Corr.	Selections
2	0.182	2,6
2	0.155	2,7
3	0.149	2,6,7
3	0.147	2,5,6
1	0.140	2
2	0.127	2,5
4	0.118	2,5-7
3	0.115	2,3,6
3	0.105	2,5,7
4	0.098	2,3,6,7

Species fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.28
Significance level of sample statistic: 29.3%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 292

Best results

No.Vars	Corr.	Selections
2	0.280	2,7
2	0.280	2,6
3	0.260	2,6,7
1	0.214	2
4	0.198	1,2,6,7
4	0.195	2,4,6,7
3	0.195	2,4,7
3	0.190	1,2,7
4	0.188	2,5-7
3	0.187	2,5,6

Species log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.227
Significance level of sample statistic: 47.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 470

Best results

No.Vars	Corr.	Selections
2	0.227	2,7
2	0.195	2,6
3	0.193	1,2,4
1	0.190	2
3	0.189	2,4,7
4	0.186	1,2,4,7
3	0.185	2,6,7
3	0.171	1,2,7
2	0.162	2,4
2	0.157	1,2

Order untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.176
Significance level of sample statistic: 64.9%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 648

Best results

No.Vars	Corr.	Selections
2	0.176	2,5
3	0.162	2,5,6
2	0.149	2,6
1	0.130	2
3	0.122	2,3,6
1	0.121	5
4	0.116	2,3,5,6
4	0.110	2,5-7
3	0.107	2,6,7
2	0.106	2,7

Order square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.192
Significance level of sample statistic: 60.8%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 607

Best results

No.Vars	Corr.	Selections
2	0.192	2,6
1	0.170	2
2	0.155	2,7
3	0.150	2,6,7
3	0.141	2,3,6
3	0.139	2,5,6
2	0.127	2,5
4	0.115	2,3,6,7
2	0.108	2,3
4	0.106	2,5-7

Order fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.289
Significance level of sample statistic: 33.8%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 337

Best results

No.Vars	Corr.	Selections
2	0.289	2,6
1	0.282	2
2	0.255	2,7
3	0.233	2,6,7
2	0.228	1,2
3	0.227	1,2,6
3	0.216	2,4,6
2	0.210	2,4
3	0.205	1,2,7
3	0.202	2,4,7

Order log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.3
Significance level of sample statistic: 27.4%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 273

Best results

No.Vars	Corr.	Selections
2	0.300	1,2
1	0.296	2
3	0.296	1,2,4
2	0.268	2,6
2	0.267	2,4
2	0.261	2,7
4	0.260	1,2,4,7
3	0.256	1,2,7
3	0.251	2,4,7
3	0.248	1,2,6

Phylum untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.167
Significance level of sample statistic: 67.5%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 674

Best results

No.Vars	Corr.	Selections
2	0.167	2,5
1	0.126	5
3	0.109	2,3,5
1	0.103	2
2	0.095	2,3
3	0.088	2,5,6
3	0.052	2,5,7
2	0.050	2,6
3	0.048	2,4,5
4	0.047	2,3,5,6

Phylum square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.123
Significance level of sample statistic: 76.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 760

Best results

No.Vars	Corr.	Selections
2	0.123	2,5
1	0.096	2
2	0.092	2,3
1	0.088	5
3	0.073	2,3,5
3	0.058	2,5,6
2	0.049	2,6
3	0.028	2,3,6
2	0.025	2,7
4	0.023	2,3,5,6

Phylum fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.121
Significance level of sample statistic: 77.6%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 775

Best results

No.Vars	Corr.	Selections
1	0.121	2
2	0.105	2,3
2	0.081	2,6
2	0.067	2,5
2	0.061	2,7
3	0.059	1,2,4
2	0.054	1,2
3	0.049	2,3,6
2	0.048	2,4
3	0.040	2,6,7

Phylum log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.142
Significance level of sample statistic: 67%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 669

Best results

No.Vars	Corr.	Selections
1	0.142	2
2	0.110	1,2
3	0.100	1,2,4
2	0.097	2,3
2	0.083	2,6
3	0.060	1,2,6
2	0.053	2,7
2	0.051	2,4
3	0.042	1-3
4	0.040	1,2,4,6

Region D BEST test results for biomass

Species untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.386
Significance level of sample statistic: 5.8%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 57

Best results

No.Vars	Corr.	Selections
4	0.386	1,4-6
4	0.379	1,4,5,7
3	0.374	1,4,5
3	0.372	1,4,7
5	0.363	1,4-7
3	0.361	4-6
5	0.357	1,3-5,7
6	0.356	1,3-7
3	0.352	1,4,6
5	0.350	1,3-6

Species square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.436
Significance level of sample statistic: 3.6%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 35

Best results

No.Vars	Corr.	Selections
3	0.436	1,4,5
2	0.423	1,4
4	0.410	1,4,5,7
4	0.405	1,3-5
3	0.404	1,4,7
4	0.394	1,4-6
5	0.394	1,3-5,7
5	0.375	1,3-6
3	0.374	1,3,4
4	0.370	1,3,4,7

Species fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.436
Significance level of sample statistic: 1.9%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 18

Best results

No.Vars	Corr.	Selections
2	0.436	1,4
3	0.405	1,4,5
3	0.385	1,3,4
4	0.379	1,3-5
3	0.370	1,4,7
4	0.358	1,4,5,7
5	0.341	1,3-5,7
3	0.338	1,4,6
4	0.336	1,3,4,7
4	0.333	1,4-6

Species log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.427
Significance level of sample statistic: 3.9%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 38

Best results

No.Vars	Corr.	Selections
2	0.427	1,4
3	0.427	1,4,5
4	0.422	1,3-5
3	0.403	1,3,4
5	0.374	1,3-5,7
4	0.369	1,4,5,7
3	0.362	1,4,7
3	0.361	3-5
4	0.352	1,3,4,7
5	0.350	1,3-6

Order untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.393
Significance level of sample statistic: 5.9%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 58

Best results

No.Vars	Corr.	Selections
2	0.393	1,6
4	0.369	1,3,6,7
3	0.368	1,3,6
5	0.361	1-3,6,7
3	0.357	1,6,7
3	0.355	1,4,6
5	0.351	1,3,5-7
4	0.350	1,2,6,7
4	0.348	1,3,4,6
3	0.348	1,2,6

Order square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.31
Significance level of sample statistic: 18.5%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 184

Best results

No.Vars	Corr.	Selections
3	0.310	1,3,4
4	0.307	1,3,4,7
5	0.302	1,3-6
4	0.301	1,3,4,6
5	0.297	1,3-5,7
4	0.293	1,3-5
6	0.286	1,3-7
5	0.283	1,3,4,6,7
4	0.280	3-6
4	0.272	1,4-6

Order fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.165
Significance level of sample statistic: 55.3%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 552

Best results

No.Vars	Corr.	Selections
3	0.165	1,3,4
2	0.160	3,4
3	0.149	3,4,7
3	0.145	3,4,6
3	0.142	3-5
4	0.136	3,4,6,7
4	0.131	1,3,4,7
4	0.131	1,3,4,6
4	0.130	3-6
4	0.124	3-5,7

Order log(X+1) transform

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.269
Significance level of sample statistic: 26.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 260

Best results

No.Vars	Corr.	Selections
3	0.269	3-5
3	0.255	1,3,4
2	0.249	3,4
1	0.243	4
4	0.235	1,3-5
2	0.230	4,5
4	0.227	3-5,7
3	0.224	3,4,7
4	0.222	3-6
4	0.212	1,3,4,7

Phylum untransformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.377
Significance level of sample statistic: 1.7%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 16

Best results

No.Vars	Corr.	Selections
3	0.377	1,4,5
4	0.362	1,3-5
2	0.354	4,5
3	0.350	3-5
1	0.336	5
4	0.314	1,4,5,7
1	0.310	4
3	0.308	1,3,5
5	0.307	1,3-5,7
2	0.301	1,5

Phylum square root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.386
Significance level of sample statistic: 3.1%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 30

Best results

No.Vars	Corr.	Selections
4	0.386	1,3-5
3	0.381	3-5
3	0.363	1,4,5
5	0.337	1,3-5,7
2	0.330	4,5
4	0.329	3-5,7
4	0.309	1,4,5,7
2	0.306	1,4
5	0.304	1,3-6
3	0.302	1,3,4

Phylum fourth root transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.237
Significance level of sample statistic: 35.7%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 356

Best results

No.Vars	Corr.	Selections
3	0.237	1,3,4
4	0.223	1,3,4,6
4	0.221	1,3,4,7
3	0.201	1,3,6
5	0.193	1,3,4,6,7
3	0.190	1,3,7
2	0.186	1,3
3	0.177	3,4,6
4	0.177	1,3,6,7
5	0.173	1,3-5,7

Phylum log(X+1) transformed

Parameters
Rank correlation method: Spearman
Method: BIOENV
Maximum number of variables: 7
Resemblance:
Analyse between: Samples
Resemblance measure: D1 Euclidean distance

Variables
1 Swash length
2 Swash period
3 Salinity
4 Penetrability
5 Grain size
6 Reciprocal slope
7 Beach index

Global Test
Sample statistic (Rho): 0.194
Significance level of sample statistic: 46.5%
Number of permutations: 999 (Random sample)
Number of permuted statistics greater than or equal to Rho: 464

Best results

No.Vars	Corr.	Selections
3	0.194	1,3,4
4	0.180	1,3,4,7
4	0.173	1,3,4,6
2	0.157	1,3
3	0.153	1,3,7
3	0.153	1,3,6
5	0.147	1,3,4,6,7
4	0.140	1,3-5
5	0.138	1,3-5,7
5	0.136	1-4,7