

PERMANOVA

Permutational MANOVA

Resemblance worksheet

Name: cp23S_Sydney_clade_rm1_stand_sqrt_resem
 Data type: Similarity
 Selection: All
 Standardise Samples by Total
 Transform: Square root
 Resemblance: S17 Bray Curtis similarity

Sums of squares type: Type III (partial)
 Fixed effects sum to zero for mixed terms
 Permutation method: Unrestricted permutation of raw data
 Number of permutations: 999

Factors

Name	Type	Levels
Site	Fixed	3
Habitat	Fixed	5
Season	Fixed	2

PAIR-WISE TESTS

Term 'SitexHabitatxSeason' for pairs of levels of factor 'Site'

Within level 'Hard coral' of factor 'Habitat'
 Within level 'Pre-bleaching' of factor 'Season'

Groups	t	P(perm)	Unique perms
Site 1, Site 2	Denominator is 0		
Site 1, Site 3	Denominator is 0		
Site 2, Site 3	Denominator is 0		

Denominators

Groups	Denominator	Den.df
Site 1, Site 2	1*Res	0
Site 1, Site 3	1*Res	0
Site 2, Site 3	1*Res	0

Average Similarity between/within groups

	Site 1	Site 2	Site 3
Site 1	100		
Site 2	100	100	
Site 3	100	100	100

Within level 'Hard coral' of factor 'Habitat'
 Within level 'Bleaching' of factor 'Season'

Groups	t	P(perm)	Unique perms
Site 1, Site 2	Denominator is 0		
Site 1, Site 3	Denominator is 0		
Site 2, Site 3	Denominator is 0		

Denominators

Groups	Denominator	Den.df
Site 1, Site 2	1*Res	0
Site 1, Site 3	1*Res	0
Site 2, Site 3	1*Res	0

Average Similarity between/within groups

	site 1	Site 2	Site 3
Site 1	100		
Site 2	100	100	
Site 3	100	100	100

Within level 'Soft coral' of factor 'Habitat'
 Within level 'Pre-bleaching' of factor 'Season'

Groups	t	P(perm)	Unique perms
Site 1, Site 2	Denominator is 0		
Site 1, Site 3	Denominator is 0		
Site 2, Site 3	Denominator is 0		

Denominators

Groups	Denominator	Den.df
Site 1, Site 2	1*Res	0
Site 1, Site 3	1*Res	0
Site 2, Site 3	1*Res	0

Average Similarity between/within groups

	Site 1	Site 2	Site 3
Site 1	100		
Site 2	100	100	
Site 3	100	100	100

Within level 'Soft coral' of factor 'Habitat'
 Within level 'Bleaching' of factor 'Season'

Groups	t	P(perm)	Unique perms
Site 2, Site 3	Denominator is 0		

Denominators

Groups	Denominator	Den.df
Site 2, Site 3	1*Res	0

Average Similarity between/within groups

	Site 2	Site 3
Site 2	100	
Site 3	100	100

Within level 'Water' of factor 'Habitat'
 Within level 'Pre-bleaching' of factor 'Season'

Groups	t	P(perm)	Unique perms
Site 1, Site 2	1.1315	0.576	2
Site 1, Site 3	17.377	0.028	15
Site 2, Site 3	11.632	0.032	15

Denominators

Groups	Denominator	Den.df
Site 1, Site 2	1*Res	6
Site 1, Site 3	1*Res	6
Site 2, Site 3	1*Res	6

Average Similarity between/within groups

	Site 1	Site 2	Site 3
Site 1	96.83		
Site 2	93.496	89.839	
Site 3	15.234	20.346	87.63

Within level 'Water' of factor 'Habitat'
 Within level 'Bleaching' of factor 'Season'

Groups	t	P(perm)	Unique perms
Site 1, Site 2	5.9156	0.025	8
Site 1, Site 3	4.1809	0.028	8
Site 2, Site 3	2.4651	0.082	35

Denominators

Groups	Denominator	Den.df
Site 1, Site 2	1*Res	6

Site 1, Site 3	1*Res	6
Site 2, Site 3	1*Res	6

Average Similarity between/within groups

	Site 1	Site 2	Site 3
Site 1	100		
Site 2	81.068	91.85	
Site 3	34.886	57.319	60.903

Within level 'Sediment' of factor 'Habitat'
 Within level 'Pre-bleaching' of factor 'Season'

Groups	t	P(perm)	Unique perms
Site 1, Site 2	2.2516	0.032	35
Site 1, Site 3	2.9157	0.021	35
Site 2, Site 3	1.4521	0.168	35

Denominators

Groups	Denominator	Den.df
Site 1, Site 2	1*Res	5
Site 1, Site 3	1*Res	6
Site 2, Site 3	1*Res	5

Average Similarity between/within groups

	Site 1	Site 2	Site 3
Site 1	65.164		
Site 2	51.258	78.749	
Site 3	23.538	55.79	57.719

Within level 'Sediment' of factor 'Habitat'
 Within level 'Bleaching' of factor 'Season'

Groups	t	P(perm)	Unique perms
Site 1, Site 2	0.96553	1	2
Site 1, Site 3	1.3441	0.326	15
Site 2, Site 3	0.41793	0.779	15

Denominators

Groups	Denominator	Den.df
Site 1, Site 2	1*Res	2
Site 1, Site 3	1*Res	4
Site 2, Site 3	1*Res	4

Average Similarity between/within groups

	Site 1	Site 2	Site 3
Site 1	73.041		
Site 2	43.26	0	
Site 3	53.819	44.6	51.773

Within level 'Macroalgae' of factor 'Habitat'
 Within level 'Pre-bleaching' of factor 'Season'

Groups	t	P(perm)	Unique perms
Site 1, Site 2	1.373	0.126	35
Site 1, Site 3	2.1764	0.043	35
Site 2, Site 3	0.93881	0.506	35

Denominators

Groups	Denominator	Den.df
Site 1, Site 2	1*Res	6
Site 1, Site 3	1*Res	6
Site 2, Site 3	1*Res	6

Average Similarity between/within groups

	Site 1	Site 2	Site 3
Site 1	34.681		
Site 2	28.523	38.925	

site 3 20.145 51.626 62.206

Within level 'Macroalgae' of factor 'Habitat'

Within level 'Bleaching' of factor 'Season'

Groups	t	P(perm)	Unique perms
Site 1, Site 2	0.7817	0.656	35
Site 1, Site 3	3.7773	0.064	15
Site 2, Site 3	2.2086	0.093	4

Denominators

Groups	Denominator	Den.df
Site 1, Site 2	1*Res	5
Site 1, Site 3	1*Res	5
Site 2, Site 3	1*Res	4

Average Similarity between/within groups

	Site 1	Site 2	Site 3
Site 1	63.755		
Site 2	51.532	25.067	
Site 3	33.602	13.247	100

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Season	Fixed	2

PAIR-WISE TESTS

Term 'SitexHabitatxSeason' for pairs of levels of factor 'Habitat'

Within level 'Site 1' of factor 'Site'
 Within level 'Pre-bleaching' of factor 'Season'

Groups	t	P(perm)	Unique perms
Hard coral, Soft coral	Denominator is 0		
Hard coral, water	1	1	1
Hard coral, Sediment	2.3145	0.032	8
Hard coral, Macroalgae	2.1133	0.136	4
Soft coral, water	63.073	0.023	4
Soft coral, Sediment	6.6088	0.034	8
Soft coral, Macroalgae	3.1001	0.035	8
water, Sediment	2.2979	0.031	15
water, Macroalgae	2.0076	0.138	8
Sediment, Macroalgae	1.8121	0.119	35

Denominators

Groups	Denominator	Den.df
Hard coral, Soft coral	1*Res	6
Hard coral, water	1*Res	6
Hard coral, Sediment	1*Res	6
Hard coral, Macroalgae	1*Res	6
Soft coral, water	1*Res	6
Soft coral, Sediment	1*Res	6
Soft coral, Macroalgae	1*Res	6
water, Sediment	1*Res	6
water, Macroalgae	1*Res	6
Sediment, Macroalgae	1*Res	6

Average Similarity between/within groups

	Hard coral	Soft coral	water	Sediment	Macroalgae
Hard coral	100				
Soft coral	0	100			
water	98.415	0	96.83		
Sediment	67.189	0	66.959	65.164	
Macroalgae	44.177	7.2563	45.596	33.175	34.681

Within level 'Site 1' of factor 'Site'
 Within level 'Bleaching' of factor 'Season'

Unique

Groups	t	P(perm)	perms
Hard coral, water	Denominator is 0		
Hard coral, Sediment	1.633	0.338	2
Hard coral, Macroalgae	2.4052	0.027	8
water, Sediment	1.633	0.345	2
water, Macroalgae	2.4052	0.026	8
Sediment, Macroalgae	1.2864	0.337	15

Denominators

Groups	Denominator	Den.df
Hard coral, water	1*Res	0
Hard coral, Sediment	1*Res	4
Hard coral, Macroalgae	1*Res	6
water, Sediment	1*Res	4
water, Macroalgae	1*Res	6
Sediment, Macroalgae	1*Res	4

Average Similarity between/within groups

	Hard coral	water	Sediment	Macroalgae
Hard coral	100			
water	100	100		
Sediment	86.521	86.521	73.041	
Macroalgae	66.084	66.084	64.251	63.755

Within level 'Site 2' of factor 'Site'

Within level 'Pre-bleaching' of factor 'Season'

Groups	t	P(perm)	Unique perms
Hard coral, Soft coral	Denominator is 0		
Hard coral, water	1	1	1
Hard coral, Sediment	3.1798	0.028	8
Hard coral, Macroalgae	2.712	0.034	8
Soft coral, water	18.654	0.032	4
Soft coral, Sediment	7.6792	0.038	8
Soft coral, Macroalgae	2.0242	0.037	8
water, Sediment	2.1602	0.049	15
water, Macroalgae	2.4027	0.029	15
Sediment, Macroalgae	1.1512	0.214	35

Denominators

Groups	Denominator	Den.df
Hard coral, Soft coral	1*Res	6
Hard coral, water	1*Res	6
Hard coral, Sediment	1*Res	5
Hard coral, Macroalgae	1*Res	6
Soft coral, water	1*Res	6
Soft coral, Sediment	1*Res	5
Soft coral, Macroalgae	1*Res	6
water, Sediment	1*Res	5
water, Macroalgae	1*Res	6
Sediment, Macroalgae	1*Res	5

Average Similarity between/within groups

	Hard coral	soft coral	water	Sediment	Macroalgae
Hard coral	100				
Soft coral	0	100			
water	94.92	5.2596	89.839		
Sediment	69.75	33.288	72.754	78.749	
Macroalgae	36.416	43.71	40.565	55.08	38.925

Within level 'Site 2' of factor 'Site'

Within level 'Bleaching' of factor 'Season'

Groups	t	P(perm)	Unique perms
Hard coral, Soft coral	Denominator is 0		
Hard coral, water	5.9156	0.024	8
Hard coral, Sediment	1.633	0.34	2
Hard coral, Macroalgae	1.2476	0.159	4

Soft coral, water	21.433	0.031	8
Soft coral, Sediment	1.633	0.342	2
Soft coral, Macroalgae	2.6398	0.034	8
Water, Sediment	0.22172	0.764	15
Water, Macroalgae	1.194	0.19	35
Sediment, Macroalgae	0.52737	1	7

Denominators

Groups	Denominator	Den.df
Hard coral, Soft coral	1*Res	6
Hard coral, water	1*Res	6
Hard coral, Sediment	1*Res	4
Hard coral, Macroalgae	1*Res	5
Soft coral, water	1*Res	6
Soft coral, Sediment	1*Res	4
Soft coral, Macroalgae	1*Res	5
Water, Sediment	1*Res	4
Water, Macroalgae	1*Res	5
Sediment, Macroalgae	1*Res	3

Average Similarity between/within groups

	Hard coral	Soft coral	Water	Sediment	Macroalgae
Hard coral	100				
Soft coral	0	100			
Water	81.068	31.446	91.85		
Sediment	50	50	56.257	0	
Macroalgae	58.401	13.247	58.112	35.824	25.067

Within level 'Site 3' of factor 'Site'

Within level 'Pre-bleaching' of factor 'Season'

Groups	t	P(perm)	Unique perms
Hard coral, Soft coral	Denominator is 0		
Hard coral, water	18.337	0.021	8
Hard coral, Sediment	3.7863	0.03	8
Hard coral, Macroalgae	5.0188	0.026	8
Soft coral, water	2.044	0.134	4
Soft coral, Sediment	2.4625	0.032	8
Soft coral, Macroalgae	1.6172	0.152	4
Water, Sediment	1.7182	0.249	35
Water, Macroalgae	1.0874	0.349	25
Sediment, Macroalgae	1.2418	0.263	35

Denominators

Groups	Denominator	Den.df
Hard coral, Soft coral	1*Res	6
Hard coral, water	1*Res	6
Hard coral, Sediment	1*Res	6
Hard coral, Macroalgae	1*Res	6
Soft coral, water	1*Res	6
Soft coral, Sediment	1*Res	6
Soft coral, Macroalgae	1*Res	6
Water, Sediment	1*Res	6
Water, Macroalgae	1*Res	6
Sediment, Macroalgae	1*Res	6

Average Similarity between/within groups

	Hard coral	Soft coral	Water	Sediment	Macroalgae
Hard coral	100				
Soft coral	0	100			
Water	15.426	89.756	87.63		
Sediment	28.503	57.938	65.83	57.719	
Macroalgae	29.859	71.029	71.915	56.858	62.206

Within level 'Site 3' of factor 'Site'

Within level 'Bleaching' of factor 'Season'

Groups	t	P(perm)	Unique perms
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Hard coral, Soft coral	Denominator is 0		
Hard coral, Water	4.1809	0.032	8
Hard coral, Sediment	2.7155	0.03	8
Hard coral, Macroalgae	Denominator is 0		
Soft coral, Water	1.8231	0.164	4
Soft coral, Sediment	2.8608	0.021	8
Soft coral, Macroalgae	Denominator is 0		
Water, Sediment	1.1241	0.287	35
Water, Macroalgae	1.5408	0.134	8
Sediment, Macroalgae	2.4178	0.065	15

Denominators

Groups	Denominator	Den.df
Hard coral, Soft coral	1*Res	6
Hard coral, Water	1*Res	6
Hard coral, Sediment	1*Res	6
Hard coral, Macroalgae	1*Res	5
Soft coral, Water	1*Res	6
Soft coral, Sediment	1*Res	6
Soft coral, Macroalgae	1*Res	0
Water, Sediment	1*Res	6
Water, Macroalgae	1*Res	5
Sediment, Macroalgae	1*Res	5

Average Similarity between/within groups

	Hard coral	Soft coral	Water	Sediment	Macroalgae
Hard coral	100				
Soft coral	0	100			
Water	34.886	71.063	60.903		
Sediment	49.986	39.215	53.136	51.773	
Macroalgae	0	100	71.063	39.215	100