

# (Fal estuary copepods)

Sediment copepod assemblages (and other fauna) from five creeks of the Fal estuary, SW England, were analysed by Somerfield PJ, Gee JM, Warwick RM 1994, *Mar Ecol Prog Ser* 105: 79-88. The sediments of this estuary are characterised by high and varying concentrations of heavy metals, a result of tin and copper mining over hundreds of years. The copepod data consist of 23 species found in 27 samples, consisting of 5 replicate cores spanning each creek (Mylor: M1-M5; Pill: P1-P5; St Just: J1-J5; Percuil: E1-E5; and 7 from the largest creek, Restronguet: R1-R7). These are in directory C:\Examples v7\Fal benthic fauna, worksheet **Fal copepod counts**(.pri), with a factor *Creek* identifying samples from the 5 creeks. There are also environmental cores (of silt/clay ratios, heavy metals etc.) matching these 27 sample locations, held in an Excel file **Fal environment**(.xls), plus nematode densities, macrofaunal counts and biomass, and associated aggregation files.

**File>Open** the copepod data and take **Pre-treatment>Dispersion weighting>**(Factor: **Creek**) & (✓Test of dispersion index) & (Num perms: **1000**) & (✓Stats to worksheet). The **Data1** sheet gives the dispersion weighted counts, which are either ready to go into the **Analyse>Resemblance** step of the next section, or could be mildly transformed before they do so, as shown earlier with **Pre-treatment>Transform(overall)>**(Transformation: **Square root**). There seems little need for the latter, however, since the dispersion weighting has already succeeded in downweighting the larger, erratic counts coming from *P. littoralis*, *R. celtica*, *E. gariene* and *T. discipes* and the somewhat less erratic *P. curticorne* and *M. falla* – the matrix **Data1** now has no dispersion-weighted ‘counts’ in double figures, and the subsequent untransformed analysis will not be dominated by a small set of species. In three columns, **Data2** gives: the mean dispersion indices  $\overline{D}$  for each species; the evidence for clumping (i.e. the % significance level for a test of  $\overline{D} = 1$ ); and the actual divisor used for that species row, which is 1 if the test does not reject this hypothesis at 5% (or better). Thus, *T. discipes* values are divided by 13.67 but *Brianola sp.* remains unchanged, though  $\overline{D} = 1.5$ . You might now like to run the routine again for the **Fal nematode abundance** file, which inspection shows must be numbers scaled up to a density, not real counts (e.g. there are no entries of 1!). The tick box for the test must be unchecked, the resulting  $\overline{D}$  values are all  $\gg 1$ , but weighting by  $\overline{D}$  is still justifiable.

The screenshot displays the PRIMER 7 software interface. The 'Factors' window on the left shows a table with 'Label' and 'Creek' columns, listing R1 through R6, all with 'R' in the 'Creek' column. The 'Dispersion Weighting' dialog box is open, showing 'Factor: Creek', 'Test of dispersion index' checked, 'Num perms: 1000', and 'Stats to worksheet' checked. The 'Data1' window shows 'Fal estuary copepods Abundance' with a table of species abundance across samples R1 to M1. The 'Data2' window shows 'Index of Dispersion (D) Coefficients Other' with a table of D, Sig%, and Divisor values for the same species and samples.

**Factors Window:**

Label	Creek
R1	R
R2	R
R3	R
R4	R
R5	R
R6	R

**Dispersion Weighting Dialog:**

Factor: Creek

☒ Test of dispersion index

Num perms: 1000

☒ Stats to worksheet

OK Cancel

**Data1 Window: Fal estuary copepods Abundance**

	R1	R2	R3	R4	R5	R6	R7	M1
Brianola sp.	0	0	0	0	0	0	0	0
Pseudobradya	1.694	1.223	0.470	1.129	0.188	1.035	0.188	1.788
Pseudobradya	0	0	0	0	0	0	0	0
Halectinosoma	0	0	0	0	0	0	0	0
Tachidius disci	0.877	0	0.146	0.146	0	0.804	0.073	0.438
Microarthridion	0.174	0.523	1.745	0.872	0.872	4.014	0.610	9.598
Harpacticus fle	0	0	0	0	0	0	0	0
Stenhelia palus	0.313	0.469	2.974	2.974	2.817	5.948	0.156	0.469
Stenhelia elizab	0	0	0	0	0.167	0.503	0.167	0.167
Amphiascoides	0.429	3.218	0.858	0.214	0	0.214	0	0.214
Robertsonia ce	0	0	0	0	0	0	0	0.201

**Data2 Window: Index of Dispersion (D) Coefficients Other**

	D	Sig%	Divisor
Brianola sp.	1.5	21.9	1
Pseudobradya	10.622	2.5863E-35	10.622
Pseudobradya	4.4365	6.7057E-07	4.4365
Halectinosoma	7.3333	0	7.3333
Tachidius disci	13.67	8.6698E-49	13.67
Microarthridion	11.46	5.4319E-39	11.46
Harpacticus fle	1.5	23	1
Stenhelia palus	6.3882	2.854E-17	6.3882
Stenhelia elizab	5.9618	0	5.9618
Amphiascoides	4.661	2.3127E-10	4.661
Robertsonia ce	19.853	5.6033E-56	19.853

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