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*Supplementary Data*

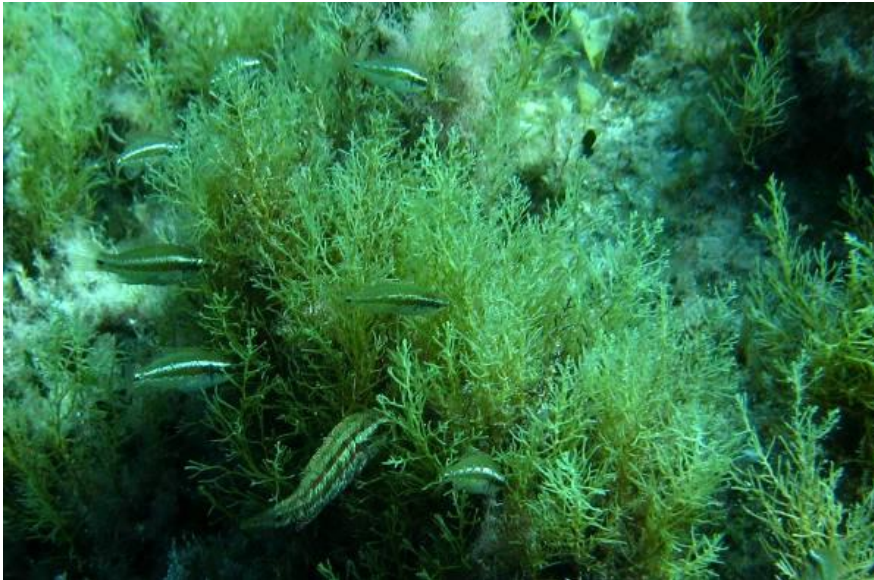
**Juvenile fish in macroalgae *Cystoseira* forests: influence of habitat complexity and depth on fish behaviour and assemblage composition**

**Amalia CUADROS, Joan MORANTA, Luis CARDONA, Pierre THIRIET,  
Patrice FRANCOUR, Eva VIDAL, Jaime SINTES and Adrien CHEMINÉE**

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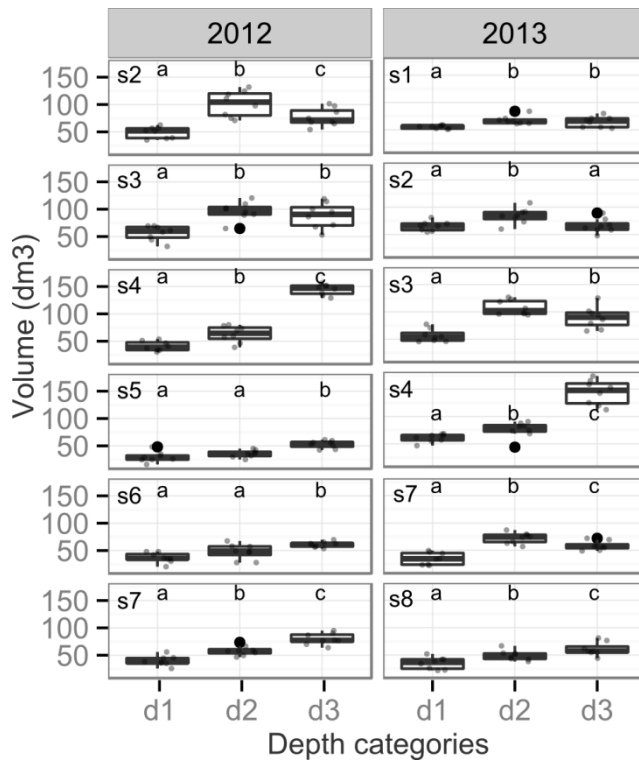
**Fig. S1a: Cryptic behavior** of a juvenile of *Symphodus ocellatus* (45 mm TL, September 2013). Photo: Amalia Cuadros.



**Fig. S1b: Wandering behavior** of *Symphodus ocellatus* juveniles (30-35 mm TL) and a *Symphodus roissali* (50 mm TL) juvenile (September 2012). Photo: Eva Vidal.



**Fig. S1c: Transitory behavior** of a juvenile of *Serranus scriba* (40 mm TL, July 2010). Photo: Adrien Cheminée.



**Fig. S2:** Boxplots of *Cystoseira* forest structure, i.e. volume, within samples according to years (2012, 2013), sites (s1 to s8) and depth categories (d1: 3-5 m, d2: 6-8 m, d3: 10-12 m). Box plots indicate the median (bold line near the center), the first and third quartile (the box), the extreme values whose distance from the box is at most 1.5 times the inter quartile range (whiskers), and remaining outliers (black dots). Pair-wise tests between treatments are given in box plots (different lower case characters indicate significant differences between treatments).

**Table S1. Permutational ANOVA table of results: influence of year, site and depth on the univariate habitat structure descriptor (volume); main test.**

Factor year (ye): 2 levels (2012 and 2013); Factor site (si): 6 levels; Factor depth (de): 3 levels (d1: 3-5 m, d2: 6-8 m, d3: 10-12 m). *P*-values were obtained by 9999 permutations of residuals under a reduced model. Significance:  $P \leq 0.1$ ; \*  $P \leq 0.05$ ; \*\*  $P \leq 0.01$ ; \*\*\*  $P \leq 0.001$ .

| Source of var. | Df  | MS      | Pseudo-F | P (perm) |
|----------------|-----|---------|----------|----------|
| Year (ye)      | 1   | 0.17597 | 0.24786  | 0.663    |
| Site (si)      | 7   | 12.173  | 17.145   | 0.0194   |
| Depth (de)     | 2   | 26.053  | 4.2431   | 0.0324   |
| yexsi          | 3   | 0.70998 | 3.8062   | 0.0124   |
| yexde          | 2   | 1.3168  | 1.7358   | 0.2523   |
| sixde          | 14  | 4.9402  | 6.5123   | 0.0174   |
| yexsixde       | 6   | 0.75859 | 4.0668   | 0.0011** |
| Residuals      | 252 | 0.18653 |          |          |
| Total          | 287 |         |          |          |

**Table S2. Results obtained with the similarity analysis (SIMPER) of *Cystoseira* forest juvenile assemblage data between groups of assemblage samples according to depth d1, d2 and d3.**

| Depth | Assemblage dissimilarity (%) | Contribution of species to dissimilarity (%)  |
|-------|------------------------------|---|
| d1-d3 | 78.46                        | <i>Thalassoma pavo</i> (26.59), <i>Coris julis</i> (23.15), <i>Symphodus</i> spp. (14.62), <i>Oblada melanura</i> (14.10) |
| d1-d2 | 63.04                        | <i>Thalassoma pavo</i> (29.88), <i>Coris julis</i> (17.14), <i>Oblada melanura</i> (16.01)                                |
| d3-d2 | 76.49                        | <i>Coris julis</i> (28.54), <i>Thalassoma pavo</i> (27.20), <i>Symphodus</i> spp (20.74)                                  |

**Table S3. Permutational ANCOVAs table of results: effect of habitat structure (volume), year, site and depth on juvenile densities per taxa.** Factor year (ye): 2 levels (2012 and 2013); Factor site (si): 6 levels; Factor depth (de): 3 levels (d1: 3-5 m, d2: 6-8 m, d3: 10-12 m). Significance:  $\cdot P \leq 0.1$  ;  $* P \leq 0.05$  ;  $** P \leq 0.01$  ;  $*** P \leq 0.001$ .

| Considered response variable     | Source of var.     | Df     | MS     | Pseudo-F | P (perm)  |
|----------------------------------|--------------------|--------|--------|----------|-----------|
| <i>Coris julis</i> densities     | Volume (covariate) | 1      | 82.099 | 12.935   | 0.0007*** |
|                                  | Year (ye)          | 1      | 3.5534 | 0.22339  | 0.6398    |
|                                  | Site (si)          | 7      | 13.375 | 0.82899  | 0.6282    |
|                                  | Depth (de)         | 2      | 42.285 | 2.4224   | 0.11      |
|                                  | yexsi              | 3      | 16.65  | 6.2518   | 0.0004*** |
|                                  | yexde              | 2      | 20.727 | 1.9544   | 0.1916    |
|                                  | sixde              | 14     | 4.5427 | 0.37185  | 0.9394    |
|                                  | yexsixde           | 6      | 12.441 | 4.6713   | 0.0001*** |
|                                  | Residuals          | 251    | 2.6632 |          |           |
| Total                            | 287                |        |        |          |           |
| <i>Thalassoma pavo</i> densities | Volume (covariate) | 1      | 146.12 | 14.47    | 0.0005*** |
|                                  | Year (ye)          | 1      | 129.63 | 7.4198   | 0.0423*   |
|                                  | Site (si)          | 7      | 21.153 | 1.3541   | 0.4471    |
|                                  | Depth (de)         | 2      | 97.285 | 3.6054   | 0.0395*   |
|                                  | yexsi              | 3      | 16.107 | 5.513    | 0.0012**  |
|                                  | yexde              | 2      | 24.178 | 4.4792   | 0.0338*   |
|                                  | sixde              | 14     | 8.5632 | 2.0364   | 0.1976    |
|                                  | yexsixde           | 6      | 4.2351 | 1.4495   | 0.1997    |
|                                  | Residuals          | 251    | 2.9217 |          |           |
| Total                            | 287                |        |        |          |           |
| <i>Symphodus</i> spp. densities  | Volume (covariate) | 1      | 411.27 | 46.166   | 0.0001*** |
|                                  | Year (ye)          | 1      | 158.12 | 20.865   | 0.0042**  |
|                                  | Site (si)          | 7      | 7.4742 | 0.99263  | 0.5498    |
|                                  | Depth (de)         | 2      | 12.741 | 0.31733  | 0.9172    |
|                                  | yexsi              | 3      | 7.5222 | 0.97382  | 0.4157    |
|                                  | yexde              | 2      | 63.864 | 8.5971   | 0.0044**  |
|                                  | sixde              | 14     | 6.2142 | 0.80735  | 0.6516    |
|                                  | yexsixde           | 6      | 7.6964 | 0.99637  | 0.4266    |
|                                  | Residuals          | 251    | 7.7244 |          |           |
| Total                            | 287                | 2869.5 |        |          |           |

**Table S4. Permutational ANCOVAs table of results: influence of habitat structure (volume), year, site and depth on juvenile total length per taxa.** Factor year (ye): 2 levels (2012 and 2013); Factor site (si): 6 levels; Factor depth (de): 3 levels (d1: 3-5 m, d2: 6-8 m, d3: 10-12 m). *P*-values were obtained by 9999 permutations of residuals under a reduced model. Significance:  $\cdot P \leq 0.1$  ; \*  $P \leq 0.05$  ; \*\*  $P \leq 0.01$  ; \*\*\*  $P \leq 0.001$ .

| Considered response variable | Source of var.     | Df  | MS     | Pseudo-F | P (perm)       |
|------------------------------|--------------------|-----|--------|----------|----------------|
| <i>Coris julis</i> TL        | Volume (covariate) | 1   | 844.97 | 3.9431   | 0.0621 $\cdot$ |
|                              | Year (ye)          | 1   | 196.37 | 1.2972   | 0.3214         |
|                              | Site (si)          | 7   | 281.41 | 5.3855   | 0.0859 $\cdot$ |
|                              | Depth (de)         | 2   | 692.54 | 5.2761   | 0.0224*        |
|                              | yexsi              | 3   | 45.823 | 0.55003  | 0.6464         |
|                              | yexde              | 2   | 42.492 | 0.15886  | 0.8333         |
|                              | sixde              | 12  | 217.9  | 0.4741   | 0.8346         |
|                              | yexsixde           | 3   | 458.99 | 5.5094   | 0.0015**       |
|                              | Residuals          | 397 | 83.31  |          |                |
| Total                        | 428                |     |        |          |                |
| <i>Thalassoma pavo</i> TL    | Volume (covariate) | 1   | 12173  | 9.5744   | 0.0026**       |
|                              | Year (ye)          | 1   | 16545  | 13.22    | 0.0041**       |
|                              | Site (si)          | 7   | 1533.3 | 1.3955   | 0.4175         |
|                              | Depth (d)          | 2   | 846.51 | 3.6428   | 0.0272*        |
|                              | yexsi              | 3   | 982.29 | 12.518   | 0.0001***      |
|                              | yexde              | 2   | 56.617 | 0.62246  | 0.5656         |
|                              | sixde              | 14  | 198.78 | 2.5222   | 0.1648         |
|                              | yexsixde           | 6   | 67.214 | 0.85655  | 0.5162         |
|                              | Residuals          | 674 | 78.47  |          |                |
| Total                        | 710                |     |        |          |                |
| <i>Symphodus</i> spp. TL     | Volume (covariate) | 1   | 46.155 | 0.36991  | 0.7616         |
|                              | Year (y)           | 1   | 156.01 | 0.36543  | 0.5812         |
|                              | Site (s)           | 6   | 470.11 | 0.6435   | 0.5875         |
|                              | Depth (d)          | 2   | 558.77 | 0.53123  | 0.7373         |
|                              | yexsi              | 3   | 334.71 | 4.5805   | 0.0053**       |
|                              | yexde              | 1   | 188.79 | 4.3378   | 0.0961 $\cdot$ |
|                              | sixde              | 9   | 246.91 | 9.4567   | 0.2166         |
|                              | yexsixde           | 1   | 20.408 | 0.27929  | 0.5929         |
|                              | Residuals          | 275 | 73.073 |          |                |
| Total                        | 299                |     |        |          |                |

**Table S5. Permutational MANCOVAs table of results: influence of fish total length (TL), habitat structure (volume), year, site and depth on juvenile multivariate behavior composition per taxa.**

Factor year (ye): 2 levels (2012 and 2013); Factor site (si): 6 levels; Factor depth (de): 3 levels (d1: 3-5 m, d2: 6-8 m, d3: 10-12 m). P-values were obtained by 9999 permutations of residuals under a reduced model. Significance: • $P \leq 0.1$  ; \*  $P \leq 0.05$  ; \*\*  $P \leq 0.01$  ; \*\*\*  $P \leq 0.001$ .

| Considered response variable                | Source of var.     | Df  | MS       | Pseudo-F | P (perm)  |
|---|--------------------|-----|----------|----------|-----------|
| <i>Coris julis</i> behavior composition     | TL (covariate)     | 1   | 97921    | 30.984   | 0.0001*** |
|   | Volume (covariate) | 1   | 11530    | 1.5178   | 0.2245    |
|   | Year (ye)          | 1   | 30994    | 2.3533   | 0.1339    |
|   | Site (si)          | 7   | 9467.7   | 0.77047  | 0.6889    |
|   | Depth (de)         | 2   | 5295.7   | 0.74566  | 0.6263    |
|   | yexsi              | 3   | 10780    | 4.0902   | 0.0008*** |
|   | yexde              | 2   | 5765.6   | 1.8998   | 0.1612    |
|   | sixde              | 12  | 3179.4   | 1.5776   | 0.3192    |
|   | yexsixde           | 3   | 2012.8   | 0.7637   | 0.5992    |
|   | Residuals          | 396 | 2635.6   |          |           |
|   | Total              | 428 |          |          |           |
| <i>Thalassoma pavo</i> behavior composition | TL (covariate)     | 1   | 4.79E+05 | 17.184   | 0.0001*** |
|   | Volume (covariate) | 1   | 6291     | 1.7765   | 0.1743    |
|   | Year (ye)          | 1   | 89713    | 18.168   | 0.0002*** |
|   | Site (si)          | 7   | 8786.2   | 2.2958   | 0.168     |
|   | Depth (de)         | 2   | 6801.3   | 1.5349   | 0.1895    |
|   | yexsi              | 3   | 3476.9   | 2.1753   | 0.048*    |
|   | Yexde              | 2   | 1577.7   | 0.47967  | 0.7069    |
|   | Sixde              | 14  | 5177.8   | 1.6258   | 0.3255    |
|   | yexsixde           | 6   | 2656.1   | 1.6618   | 0.0846    |
|   | Residuals          | 673 | 1598.4   |          |           |
|   | Total              | 710 |          |          |           |
| <i>Symphodus</i> spp. behavior composition  | TL (covariate)     | 1   | 8517.5   | 1.8392   | 0.1616    |
|   | Volume (covariate) | 1   | 30780    | 1.0022   | 0.4331    |
|   | Year (ye)          | 1   | 5285.6   | 0.53525  | 0.5672    |
|   | Site (si)          | 6   | 25548    | 1.5202   | 0.3894    |
|   | Depth (de)         | 2   | 15161    | 0.73876  | 0.6575    |
|   | yexsi              | 3   | 7025.1   | 3.3003   | 0.0028**  |
|   | yexde              | 1   | 10883    | 1.2127   | 0.3236    |
|   | sixde              | 9   | 11244    | 0.81578  | 0.6703    |
|   | yexsixde           | 1   | 10546    | 4.9544   | 0.0087**  |
|   | Residuals          | 272 | 2128.6   |          |           |
|   | Total              | 297 |          |          |           |