

Composition and temporal variation of the algal assemblage associated with the sponge *Haliclona indistincta* (Bowerbank)

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Introduction

Algae and sponges coexist in many marine and freshwater environments and establish a wide range of interactions. It has been recognized that in certain habitats algal-sponge interactions have a great ecological significance. To date, however, only a few studies have analysed in detail the diversity of the algal assemblages associated with sponges. We examined the composition and temporal variation of the algal assemblage associated with a population of *Haliclona indistincta* (Demospongiae, Haplosclerida) at a sheltered site on the western Irish shore (Corranroo, Galway Bay).



Fig.1: Corranroo, Galway Bay, where the sponges were collected every month

Material and Methods

Thirty individuals of *H. indistincta* were collected each month for a complete annual cycle (September 2009 to August 2010) in Corranroo, Galway Bay. The algal epibionts were removed and identified morphologically.



Fig. 2: *Haliclona indistincta* showing some algal epibionts

Number of species found in each month

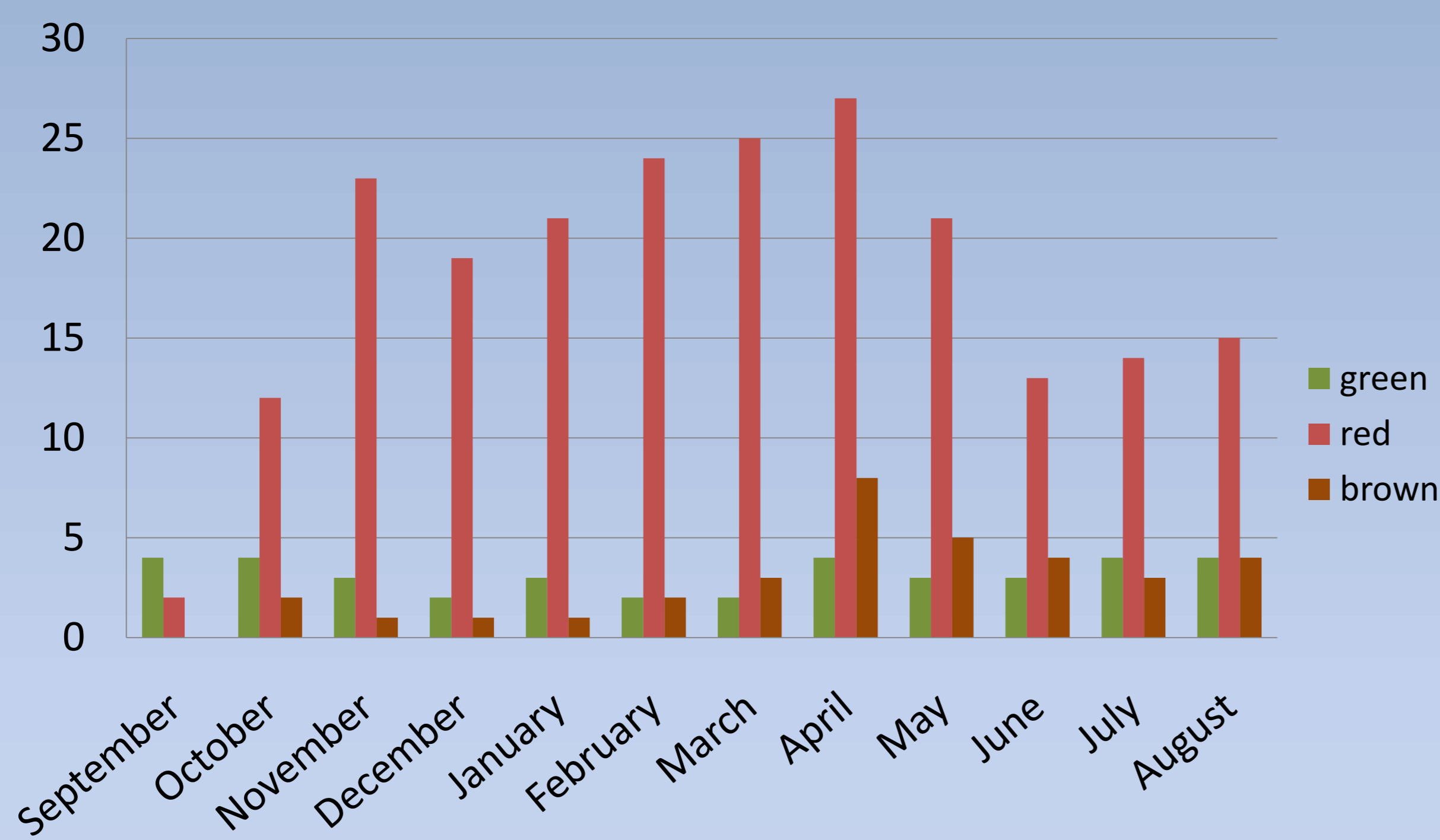


Fig. 3: Graph showing the number of green, red and brown algal epibionts found in the sponges every month

Number of species per sponge found in each month

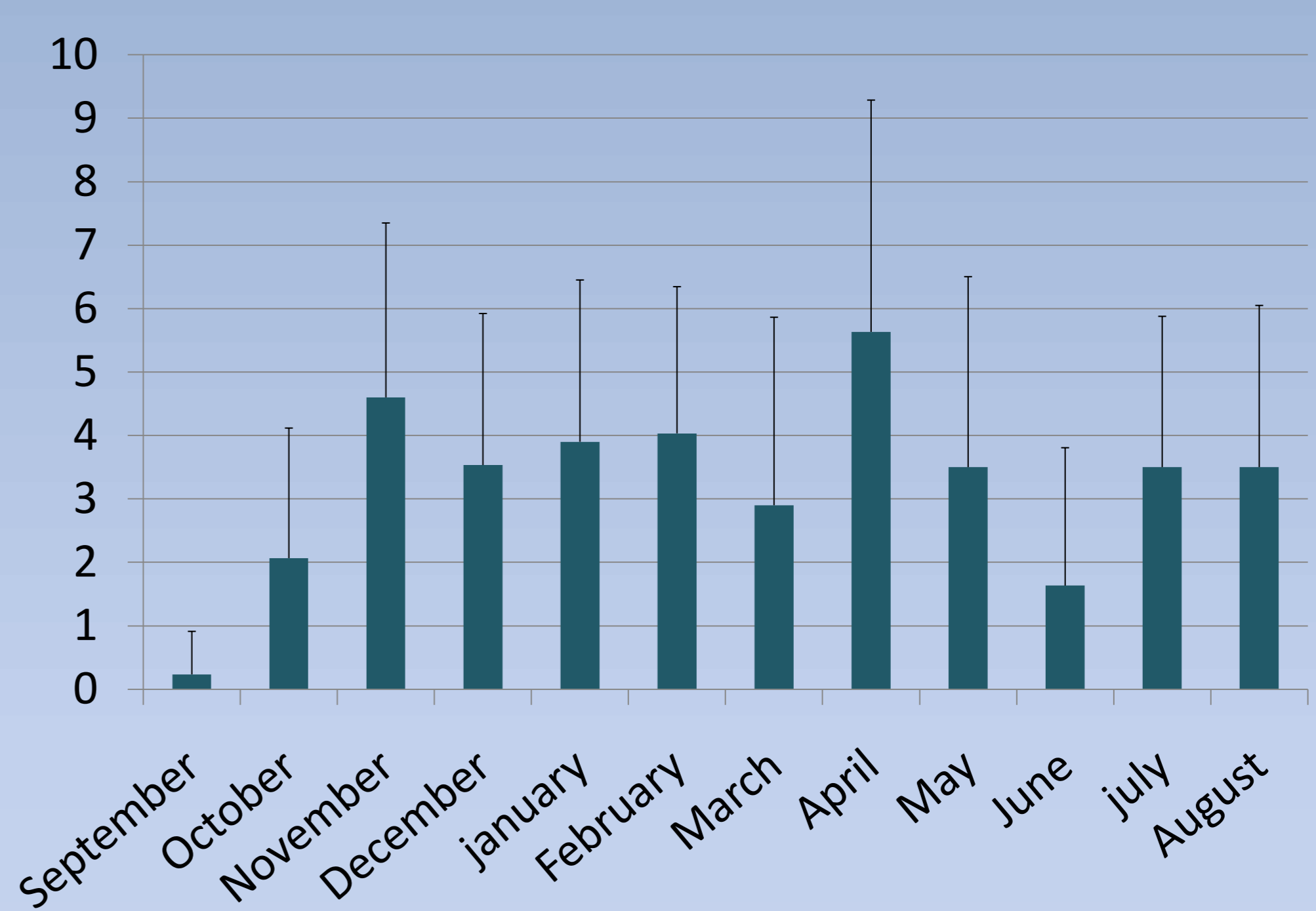


Fig. 3: Graph showing the average number of algal epibionts found in each sponge every month

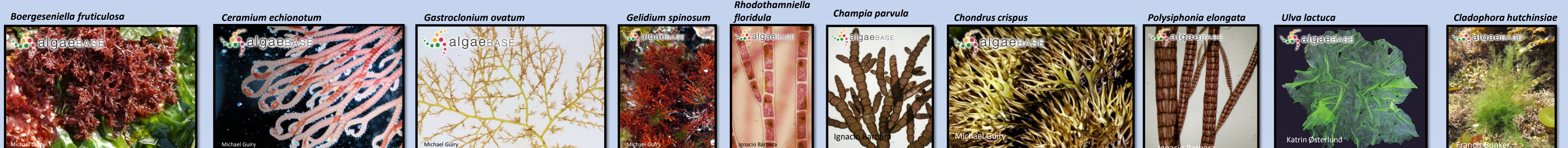


Table 1: List of species found and months in which they were present. The top 10 most common are highlighted in bold and in pictures above

species name	September	October	November	December	January	February	March	April	May	June	July	August
<i>Aglaothamnion</i> sp. (mostly <i>A. gallicum</i>)	-	P	-	-	-	P	P	-	-	-	-	-
<i>Anoetichium barbatum</i>	-	-	-	-	P	P	-	-	-	-	-	-
<i>Anthothamnion</i> sp.	-	-	P	-	-	-	P	-	-	-	-	-
<i>Apoglossum ruscifolium</i>	-	-	P	P	P	P	P	-	-	-	-	-
<i>Asparagopsis</i> sp. (<i>Falkenbergia</i> form)	-	P	-	-	-	-	-	-	-	-	-	-
<i>Asperococcus fistulosus</i>	-	-	-	-	-	-	-	P	-	-	P	-
<i>Audouinella</i> sp.	-	P	-	-	-	-	-	-	-	-	-	-
<i>Bannemaisonia hamifera</i> (<i>Trallielia</i> phase)	-	-	-	-	-	P	-	-	-	-	-	-
<i>Boergeseniella fruticulosa</i>	-	-	P	P	P	P	-	P	P	P	P	P
<i>Bryopsis plumosa</i>	-	-	-	-	-	-	-	-	-	P	P	-
<i>Cailliepharis tubata</i>	-	-	P	-	-	-	-	P	-	-	P	-
<i>Calliophyllis laciniata</i>	-	-	-	-	-	-	P	-	-	-	-	-
<i>Campostamnion thuyoides</i>	-	-	-	-	-	-	-	P	-	-	-	-
<i>Ceramium ciliatum</i>	-	P	P	P	-	-	-	P	P	P	-	-
<i>Ceramium echionotum</i>	-	-	P	P	P	P	P	P	P	P	P	P
<i>Ceramium cr. pallidum</i>	-	-	-	-	-	-	-	P	P	P	-	-
<i>Ceramium virgatum</i>	-	-	-	-	-	-	-	P	P	-	-	-
<i>Chaetomorpha</i> sp.	P	P	-	-	-	-	-	-	-	-	-	-
<i>Champia parvula</i>	-	-	P	P	P	P	P	-	-	P	P	-
<i>Chondrochaitum acicularis</i>	-	-	P	-	-	-	-	-	-	-	-	-
<i>Chondrus crispus</i>	-	-	-	P	-	P	P	P	P	-	-	P
<i>Chylocladia verticillata</i>	-	-	-	-	-	-	-	P	P	P	-	-
<i>Cystoseira</i> cf. <i>Nodocaulis</i>	-	-	-	-	-	-	-	-	-	-	-	P
<i>Cladophora</i> sp. mostly <i>C. hutchinsiae</i>	P	P	P	P	P	P	P	P	P	P	P	P
<i>Colpomenia perigrina</i>	-	-	-	-	-	-	-	P	P	P	-	-
<i>Corallina</i> sp. mostly <i>C. officinalis</i>	-	-	-	-	-	P	P	-	-	P	P	-
<i>Cystocodium purpureum</i>	-	-	-	P	P	-	-	-	-	-	-	-
<i>Cryptopleura ramosa</i>	-	-	P	-	-	-	-	-	-	-	-	-
<i>Dasya</i> sp.	-	-	-	-	-	-	-	-	-	-	-	-
<i>Dictyota dichotoma</i>	-	-	-	-	P	P	-	-	P	P	P	-
<i>Ectocarpus</i> sp.	-	P	-	-	-	-	-	-	P	P	-	-
<i>Furcellaria lumbricalis</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Gastroclonium ovatum</i>	-	-	P	P	P	P	P	P	P	P	P	P
<i>Gelidium spinosum</i>	-	P	P	P	P	P	P	P	P	P	P	-
<i>Griffithsia corallinoides</i>	-	P	-	-	-	-	-	-	-	-	-	-
<i>Haldrys siliquosa</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Heterosiphonia japonica</i>	-	P	P	P	P	P	P	P	P	-	-	-
<i>Heterosiphonia plumosa</i>	-	-	P	P	P	P	P	-	-	-	-	-
<i>Hincksia secunda</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Hypoglossum hypoglossoides</i>	-	P	P	-	-	-	-	-	-	-	-	-
<i>Jania rubens</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Laurencia obtusa</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Lomentaria articulata</i>	-	-	-	-	-	P	P	P	P	-	-	P
<i>Lomentaria clavellata</i>	-	-	P	P	-	P	P	P	-	-	-	-
<i>Lomentaria</i> sp.	-	-	-	-	-	-	-	-	-	-	-	-
<i>Monosporus pedicellatus</i>	-	-	P	-	-	-	-	-	-	-	-	-
<i>Monostroma grevillei</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Nitophyllum punctatum</i>	-	-	-	-	-	-	-	-	-	-	-	P
<i>Osmundea pinnatifida</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Osmundea truncata</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Petalonia fasciata</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Percursaria percurva</i>	P	-	-	-	-	-	-	-	-	-	-	-
<i>Plocamium</i> sp.	-	-	P	-	-	-	-	-	-	-	-	-
<i>Polysiphonia brodiei</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Polysiphonia elongata</i>	-	-	P	P	P	P	-	-	-	-	-	P
<i>Polysiphonia stricta</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Pterosiphonia parasitica</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Pterosiphonia pennata</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Punctaria latifolia</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Rhododroma confervoides</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Rhododroma divaricata</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Rhodothamniella floridula</i>	P	P	P	P	P	P	P	P	P	P	P	P
<i>Kelp</i>	-	-	-	-	-	-	-	-	-	-	-	-
<i>Sphacelaria</i> sp.	-	P	P	-	-	-	-	-	-	-	-	-
<i>Ulva</i> sp. mostly <i>U. lactuca</i>	-	P	P	P	P	P	P	P	P	P	P	P
<i>Ulva</i> sp. (<i>Enteromorpha</i> form)	-	-	-	-	-	-	-	-	-	-	-	-
unidentified <i>Deliseeriaceae</i>	P	-	P	-	-	-	-	-	-	-	-	-
unidentified <i>Ceramiales</i>	-	-	-	-	-	-	-	-	-	-	-	-

Results and Conclusions:

- Sixty seven species were identified as epibionts of *H. Indistincta*, mostly rhodophytes (fig.3)
- The algal assemblage was most diverse and best developed in the period late winter-early spring
- The highest species richness was recorded in April 2010: 39 species were found (Table 1)
- Also in April, the highest mean number of algal species per sponge individual was recorded: ~6 (fig.4)
- There was considerable variation between different sponge individuals in terms of algal coverage and diversity. (fig.4), with 13 being the highest number recorded (March -Table 1)
- The red algae *Boergeseniella fruticulosa*, *Ceramium echionotum*, *Gastroclonium ovatum*, *Gelidium spinosum*, *Rhodothamniella floridula*, *Champia parvula*, *Chondrus crispus*, *Polysiphonia elongata* and green alga *Ulva lactuca* and *Cladophora hutchinsiae* were the most common species found associated with *H. Indistincta* (Table 1)
- Whereas most algae were epibiontic on *H. indistincta*, larger-sized species (such as *C. officinalis* and *G. clavatum*) appeared to be primarily epilithic algae which got entrapped in the sponge tissues upon sponge growth.
- Most algal species did not appear to be specifically associated with *H. indistincta* and were also observed on abiotic substrata at the sampling site

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