C. caespitosa. Photoacclimation experiments showed that both species had maximum photosynthetic rate (P_m) and photosynthetic efficiency (α) at 20-40 µmol photons m^{-2} s^{-1}. *Bostrychia scorpioides* had higher P_m, α, dark respiration rate and light compensation point (E_c) than *C. caespitosa* at all acclimation irradiances. Growth-irradiance curves revealed a higher E_c value for growth in *B. scorpioides* than for *C. caespitosa*, which agreed with the irradiance at their respective distributional limits in the field. While light clearly restricts the growth of *B. scorpioides* to the uppermost intertidal zone, it would not prevent *C. caespitosa* from growing at saturating irradiances. However, *C. caespitosa* is absent at the upper intertidal zone where that high light occurs. At the uppermost level of the intertidal, the longer periods without nutrient supply could limit the performance of *C. caespitosa* to a certain extent, whereas *B. scorpioides* would be more able to cope with the reduced nutrient availability given its greater independence on external supply. Both species have distinct capacities for acquiring nutrients and different light requirements, which partially explains their intertidal zonation.

MANTON.8

BACTERIAL DIVERSITY CHANGES TO SIMULATED LOCAL AND GLOBAL STRESSORS ON THE CANOPY-FORMING ALGA *CYSTOSEIRA COMPRESSA*

Francesco Paolo Mancuso[1] (francesco.mancuso4@unibo.it), Olivier De Clerck[2] (Olivier.DeClerck@UGent.be) and Laura Airoldi[1] (laura.airoldi@unibo.it)

[1]*Dipartimento di Scienze Biologiche, Geologiche ed Ambientali, University of bologna, Ravenna 48123, Italy and* [2]*Phycology Research Group and Center for Molecular Phylogenetics and Evolution, Ghent University, Ghent 9000, Belgium*

Canopy-forming brown algae provide structurally complex habitats to a variety of species, along temperate rocky coasts. This includes rich but understudied microbial communities, triggered by availability of protected micro-niches and large amount of organic carbon. Canopy-forming algae are retracting worldwide particularly in urban areas, where they tend to be replaced by low-lying, turf-forming algae. Recent works suggests that nutrient enrichment (typical of many coastal regions) interact synergistically with other local and global stressors accelerating this shift, but the underlying causes of these effects are unknown. Epiphytic bacteria can functionally regulate and support the productivity and the resilience of macroalgae. Therefore, we hypothesised that the loss of canopy-forming algae might be mediated by changes in the epiphytic microbial communities in response to interacting local and global stressors. We used next generation sequencing (Illumina, Miseq) to characterise the epiphytic bacteria associated to the canopy-forming alga *Cystoseira compressa*, as this is one of the most relevant canopy-forming algae in the low intertidal shores around Italy. We also carried out a factorial experiment to investigate the combined effects of nutrient enrichment (local anthropogenic stressors) and heat stress (climate change-related stressors) on the survival, growth and photosynthetic rate of *C. compressa* and the diversity of associated microbial communities. Results showed a significant increase in OTU richness with increasing of algal surface age. Moreover, there was a clear difference between the microbial composition associated with macroalgae and that of the surrounding seawater. Finally, in situ experiment showed an effect of nutrient enrichment and heat stress on both photosynthetic activity and bacterial community composition.

MANTON.9

INVESTIGATING THE FEASIBILITY OF HIGH VALUE COMPOUND PRODUCTION IN MICROALGAE

Julie AZ Zedler[1] (jazz@kent.ac.uk), Doris Gangl[1] (d.gangl@kent.ac.uk), Björn Hamberger[2] (bjoernh@plen.ku.dk), Saul Purton[3] (s.purton@ucl.ac.uk) and Colin Robinson[1] (c.robinson-504@kent.ac.uk)

[1]*School of Biosciences, University of Kent, Canterbury CT2 7NJ, United Kingdom;* [2]*Department of Plant and Environmental Sciences, University of Copenhagen, Frederiksberg C DK-1871, Denmark and* [3]*Institute of Structural and Molecular Biology, University College London, London WC1E 6BT, United Kingdom*

Microalgae have recently been shown to hold significant promise as a novel biotechnological production platform. A commonly used model organism is the green microalga *Chlamydomonas reinhardtii*. Previous studies have mainly focused on the production of recombinant proteins, but not much has been done to investigate the feasibility of high value compound production in microalgae. We want to explore the potential benefits and limitations of microalgae for biotechnological applications. Terpenoids are a large class of high value natural products. They are an attractive target for engineering, as they often cannot be synthesised chemically due to their complexity. To date, these compounds usually are extracted from higher plants at low yields. Producing them in microalgae could be a sustainable and cost-effective alternative. In the algal cell, recombinantly expressed