CERF 2009 ABSTRACT :

Seagrasses Under Stress: Linkages With Epiphytic Biofilms And Eutrophication ?

Kirk Cammarata, Jennifer Sweatman, Valerie Chilton, Erik Helander, Stephanie Dovalina, and Venis Graham; TX A&M University-Corpus Christi, Life Sciences Department, 6300 Ocean Dr., Corpus Christi, TX 78412

Biofilms of epiphytes (bacteria, algae, fungi) are implicated in global seagrass declines due to shading effects on productivity. However, biofilms present complex physical/chemical environments with spatiotemporal variation and interesting biological interactions. Imaging and genomic methods are being developed to study linkages between nutrients, epiphytes and seagrass stress. A fluorescence-based digital imaging method was developed to quantify, with high spatiotemporal resolution, photosynthetic epiphytes containing phycobilin and fucoxanthin accessory pigments. High resolution images (10 µm) of individual seagrass blades reveal epiphyte accumulation patterns along the age gradient of the leaf. The method utility is extended with artificial substrates because absence of leaf chlorophyll permits imaging of green algal/cyanobacterial epiphyte components and captures recruitment temporally. Comparison of *Halodule wrightii* epiphytes from 2 Texas coastal bay systems showed 25-fold differences in epiphyte loading, and seagrasses at different depths within the same site revealed 5-fold more epiphytes and greater abundance of green algal components on shallow seagrasses. The method facilitates micro-landscape analyses suitable for routine monitoring and data archiving.

Linkage between the epiphyte landscape and environmental conditions is explored by DNA-based species characterization because diversity/richness will be affected by biogeochemical conditions and climate change. Bacterial epiphyte populations from 2 Texas bays were compared by 16S rDNA profiling. Representative species assemblages profiled by denaturing gradient gel electrophoresis (DGGE) suggest some bacterial preferences for both seagrass host and location. Analysis of a bacterial clone library suggests an interface between aerobic and anaerobic conditions.

Stress-response genes are being cloned from Halodule to develop gene expression-based leading indicator assays for seagrasses under stress.