In situ Monitoring of Seagrass Epiphytes, Mesograzers and the Macrograzers they Support.

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HYPOTHESIS

Snorkeling and SCUBA diving allow for the identification and quantification (Braun-Blanque) of seagrasses. This tells much about the feedstock for large macrograzers such as herbivorous fish (Parrotfish etc.), turtles and manatees.

However, the seagrass epiphyte community, which can be as much as 30% of the combined seagrass plus epiphyte biomass (References in Frankovich and Fourquerean, 1997) is extremely important as a food source for micro- and meso-grazers. This include a wide array of fish, many of which are the targets of sport and commercial fisheries. We contend that if the importance of seagrass in supporting sport fishing is better known and that information passed on to legislators and managers then increased funding for seagrass restoration may follow.

SUPPORTING DATA

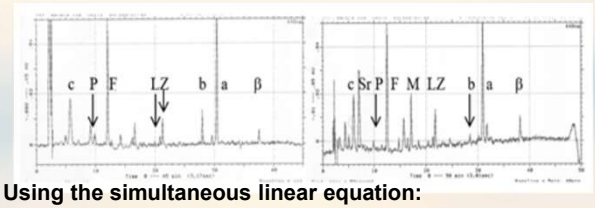
Epiphytes can be sampled directly from living seagrass as well as fake seagrass which we call an "epiphytometer". The epiphytometer consists of

Mylar strips that have been deglazed with 100 grit sandpaper.

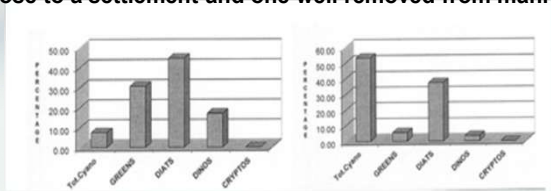
We have found that seagrass and epiphytometer blades must be collected by placing a 15 mL or larger screw top polyethylene test tube over the blade, cutting at the bottom and capping the tube. This captures non-attached loosely held microalgae that would otherwise slough off during collection and handling. A sample of seawater above the seagrass / epiphytometer is also taken in order to assess the phytoplankton population which may skew the microalgal results of the epiphyte community. Rarely this is even a factor.

Analyzing the epiphyte microalgal community consists of gently scrapping the seagrass / epiphytometer blade with a polyethylene or Teflon blade into an aluminum or Teflon bowl. The scrapings are then washed with 3.5% $NaCl_{(aq)}$ into a vacuum filter unit containing a Whatman GFF filter. The filter is then removed, folded in half, blotted between paper towel, folded again (quartered) and immediately frozen. The filter is extracted in dim yellow light with methanol : acetone : dimethylformaimide : water (30:30:30:10 v). The UV/Vis absorption spectrum of the crude extract is taken and then the pigments are separated by HPLC(See Louda et al., 2021).

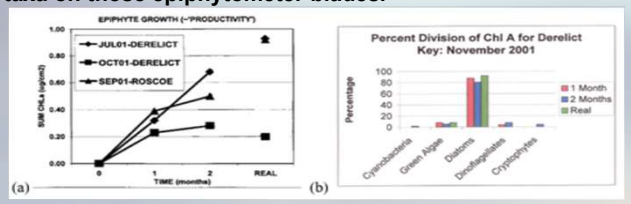
Below are two HPLC examples of epiphytes from *Thalassia testudinum* in the Bahamas.



Using the simultaneous linear equation:
(1.1xZEA)+(2.5XCHLb)+(1.2xFUCO)+(1.5xPERI)+(1.5xALLO)
we calculate the amount of Chlorophyll-a, as a biomass proxy, contributed by cyanobacteria, chlorophytes, diatoms, dinoflagellates, and cryptophytes, respectively. The taxon histograms below are derived from the HPLCs above and represent epiphyte communities from two distinct areas, one close to a settlement and one well removed from man.



Epiphytometers also allow an easy way to follow epiphyte recruitment and growth trends. Below (left) is a plot of the growth of epiphytes on epiphytometers deployed in 3 different basins within Florida Bay and reference points for well established real seagrass. The right figure contains the pigment-based chemotaxonomic assessment of the epiphyte taxa on those epiphytometer blades.



CONCLUSIONS / SUGGESTIONS

The use of epiphytometers and pigment-based chemotaxonomy of the epiphyte is a relatively easy and rapid way to address the taxa, recruitment and growth of epiphytes.

What is needed to complete the assessment of seagrass epiphyte influences on micro-and meso-grazers is coincident deployment of underwater cameras, such as the GoPro series, to capture pictures of the grazers (notably fish) every 15 minutes or so, both day and night. Together, epiphyte analyses and identification with quantitative estimates of fish grazing would complete the story.

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