

DOES ULTRAVIOLET RADIATION INDUCE CHANGES IN THE
PHOTOPHYSIOLOGY AND PHOTOCHEMISTRY OF *HALOPHILA JOHNSONII*
EISEMAN?

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TABLE OF CONTENTS

ABSTRACT	iv
ACKNOWLEDGMENTS	vi
LIST OF TABLES	vii
LIST OF FIGURES	viii
INTRODUCTION	1
METHODS	11
Sample Collection	11
Experimental Arrangement	11
Chlorophyll Fluorescence Measurements	14
UV Fluorescence Measurements	15
Pigment Extraction and Analysis	16
High Performance Liquid Chromatography	17
Diurnal Sampling	18
Data Analysis	18
RESULTS	20
Rapid-Light Curves	20
UV Fluorescence	30
UV-Absorbing Pigment Analysis	30
Chlorophyll and Carotenoid Analysis	34
High Performance Liquid Chromatography	39
Diurnal Patterns	39

DISCUSSION	45
LITERATURE CITED	51

ABSTRACT

Halophila johnsonii is currently listed as threatened on the U.S. Endangered Species List due to its rarity within an extremely limited range of distribution. This species tends only to establish from the mid-intertidal down to 3 meters depth. Previous work has demonstrated that *Halophila johnsonii*, differing from its conspecific *Halophila decipiens*, exhibits high-light adapted photophysiology and contains a compound that absorbs maximally at 350 nm. Both of these characteristics were found to vary significantly following 4 days of acclimation during a reciprocal transplant experiment. Based on the plasticity of these photophysiological and photochemical responses, a controlled irradiance experiment was performed in an outdoor mesocosm utilizing the incident solar spectrum. Three different cut-off filters were used to measure the response of greenhouse-acclimated plants to PAR + UVA + UVB and PAR + UVA, versus PAR alone. Changes in photosynthetic efficiency were measured by pulse amplitude modulated (PAM) fluorometry. A newly-developed fluorometer, a UVA PAM, was used to monitor changes in UV protection. Variations in pigment characteristics such as UV absorbance, chlorophyll *a* and *b*, and total carotenoid concentrations were monitored over the course of the experiment in order to quantify both short- and long-term acclimation to different UV treatments. While significant changes in all parameters were observed within each of the treatments during the 21-day experiment, there were few differences among the three treatments. The factor that most influenced the physiological changes observed was the 2-fold increase in PAR that occurred when all experimental replicates were moved from the greenhouse to the outdoor mesocosms. The ability to acclimate with high tolerances to both UV irradiance and PAR may be a factor allowing *Halophila*

johnsonii to exist intertidally while it appears to be competitively excluded subtidally.

Perhaps the shallow intertidal exists as a refuge for this rare and protected species.

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LIST OF TABLES

Table	Page
<p>1. Summary of fluorescence parameters examined in the outdoor irradiance experiment. One-way ANOVA results comparing the 3 irradiance treatments on each day and also the different days of the experiment within each treatment. Mean $\pm$ sd, F-values; $P < 0.05 = *$; $P < 0.01 = **$; $P < 0.001 = ***$; $df = 2$, $n = 18$</p>	21
<p>2. Summary of pigment parameters examined in the outdoor irradiance experiment. One-way ANOVA results comparing the 3 irradiance treatments and also the different days of the experiment within each treatment. Mean $\pm$ sd, F-values; $P < 0.05 = *$; $P < 0.01 = **$; $P < 0.001 = ***$; $df = 2$, $n = 3$</p>	36

LIST OF FIGURES

Figure	Page
1. a. Map of <i>Halophila johnsonii</i> 's southeastern Florida distribution. b. Illustration of a <i>Halophila johnsonii</i> rhizome with leaf pairs and apical. Illustration courtesy of: Phillips and Menez, 1988	2
2. The structural formulas and molecular weights of 3 mycosporine-like amino acids: porphyra-344, palythine, and shinorine; and 3 flavonoids: kaempferol, luteolin, and quercetin	8
3. Comparison of total spectral irradiance under different treatment filter panels	12
4. Rapid Light Curves for <i>Halophila johnsonii</i> replicates grown under a. PAR, b. PAR + UVA, and c. PAR + UVA + UVB on day 1, 4, and 21. Symbols = mean, error bars = sd, n = 18.....	22
5. Rapid Light Curves for <i>Halophila johnsonii</i> replicates grown under PAR, PAR + UVA, and PAR + UVA + UVB on a. day 1, b. day 4, and c. day 21. Symbols = mean, error bars = sd, n = 18.....	23
6. Sample Rapid Light Curve measured from <i>Halophila johnsonii</i> by Pulse Amplitude Modulated (PAM) fluorometry and analysis of alpha, $P_{\max}$, and beta regression lines	24
7. Comparison of alpha for <i>Halophila johnsonii</i> replicates grown under a. PAR, b. PAR + UVA, and c. PAR + UVA + UVB on day 1, 4, and 21. Median = solid horizontal line, box = 25th and 75th percentiles, and error bars = 10th and 90th percentiles, n = 18	26
8. Comparison of $P_{\max}$ for <i>Halophila johnsonii</i> replicates grown under a. PAR, b. PAR + UVA, and c. PAR + UVA + UVB on day 1, 4, and 21. Median = solid horizontal line, box = 25th and 75th percentiles, and error bars = 10th and 90th percentiles, n = 18	27
9. Comparison of beta for <i>Halophila johnsonii</i> replicates grown under a. PAR, b. PAR + UVA, and c. PAR + UVA + UVB on day 1, 4, and 21. Median = solid horizontal line, box = 25th and 75th percentiles, and error bars = 10th and 90th percentiles, n = 18	28
10. Comparison of apparent photosynthetic quantum yield for <i>Halophila johnsonii</i> replicates grown under a. PAR, b. PAR + UVA, and c. PAR + UVA + UVB on day 1, 4, and 21. Median = solid horizontal line, box = 25th and 75th percentiles, and error bars = 10th and 90th percentiles, n = 18.....	29

11. Comparison of percent UV shield for <i>Halophila johnsonii</i> replicates grown under a. PAR, b. PAR + UVA, and c. PAR + UVA + UVB on day 1, 4, and 21. Median = solid horizontal line, box = 25th and 75th percentiles, and error bars = 10th and 90th percentiles, n = 18.....	31
12. Comparison of <i>Halophila johnsonii</i> absorption spectra in 100% methanol and 90% acetone	32
13. Absorption spectrum of <i>Halophila johnsonii</i> leaf pair extracted in 100% methanol showing wavelength ranges for analysis. UV peak 1 = the integrated area under the curve 250-310 nm, UV peak 2 = the integrated area under the curve 310-400 nm.....	33
14. Integrated area under the curves for <i>Halophila johnsonii</i> replicates grown under PAR, PAR + UVA, and PAR + UVA + UVB on day 0, 1, 2, 3, 4, 6, 10, and 21. Symbols = mean, error bars = sd, n = 3.....	35
15. The relationship between percent UV shield as measured by the UVA PAM and total area UV peaks derived from analysis of pigment spectra. Symbols = day of measurement. $r^2 = 0.61$	37
16. Pigment concentrations for <i>Halophila johnsonii</i> replicates grown under PAR, PAR + UVA, and PAR + UVA + UVB on day 0, 1, 2, 3, 4, 6, 10, and 21. Symbols = mean, error bars = sd, n = 3	38
16. Comparison of HPLC chromatogram measured from a. extracts of <i>Halophila johnsonii</i> and b. prepared standards of palythine (P), shinorine (S), and porphyra-334 (P334). Absorbance at 214 and 340 nm was detected for both samples.	40
17. Diurnal changes in <i>Halophila johnsonii</i> growing a. in the greenhouse and b. on the outdoor platform. Changes in P_{max} and apparent photosynthetic quantum yield sampled at 06:00 to 20:00 hrs. Symbols = mean, error bars = sd, n = 10; ● P_{max} ; □ apparent photosynthetic quantum yield; ▲ irradiance.....	41
18. Diurnal changes in <i>Halophila johnsonii</i> growing a. subtidal and b. intertidal at Haulover Park in northern Biscayne Bay. Changes in P_{max} and apparent photosynthetic quantum yield sampled at 06:00 to 20:00 hrs. Symbols = mean, error bars = sd, n = 10; ● P_{max} ; □ apparent photosynthetic quantum yield; ▲ irradiance.....	42