

**Supplemental Material**

**Title:** Sex and microhabitat influence the uptake and allocation of mycosporine-like amino acids to tissues in the purple sea urchin, *Strongylocentrotus purpuratus*

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**Authors:** Sarah A. Gravem and Nikki L. Adams

**Corresponding Author Affiliation:** Bodega Marine Laboratory, University of California Davis

**Corresponding Author Email:** [sgravem@gmail.com](mailto:sgravem@gmail.com)

**Table S1** Restricted Maximum Likelihood (REML) analysis of fixed effects using sequential sums of squares for *S. purpuratus* gonadal tissues. The dependent variable is the concentration of gonadal MAAs (nmol mg<sup>-1</sup> dry wt), N = 119

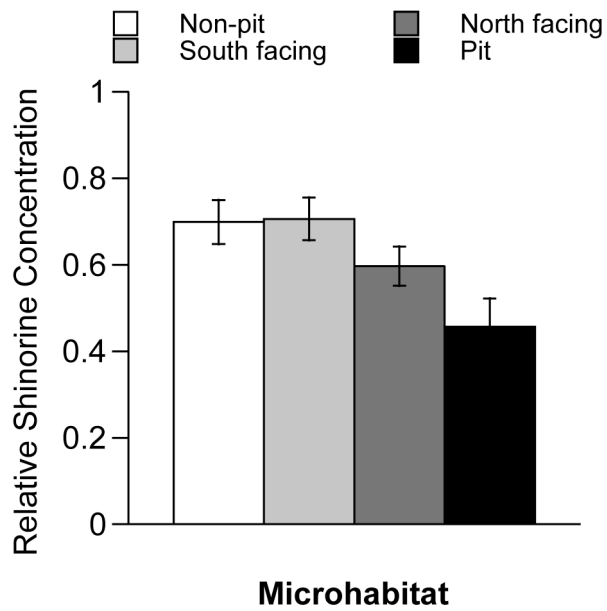
Source	<i>df</i>	<i>F</i>	<i>P</i>
Month	1	7.93	0.005
Sex	1	7.64	0.006
Microhabitat	3	2.46	0.138
Month * Sex	1	1.40	0.238
Month * Microhabitat	3	1.61	0.188
Sex * Microhabitat	3	3.22	0.024
Month * Sex * Microhabitat	3	0.41	0.744

**Table S2** Restricted Maximum Likelihood (REML) analysis of fixed effects using sequential sums of squares for *S. purpuratus* epidermal tissues. The dependent variable is the concentration of epidermal MAAs (nmol mg<sup>-1</sup> dry wt), N = 119

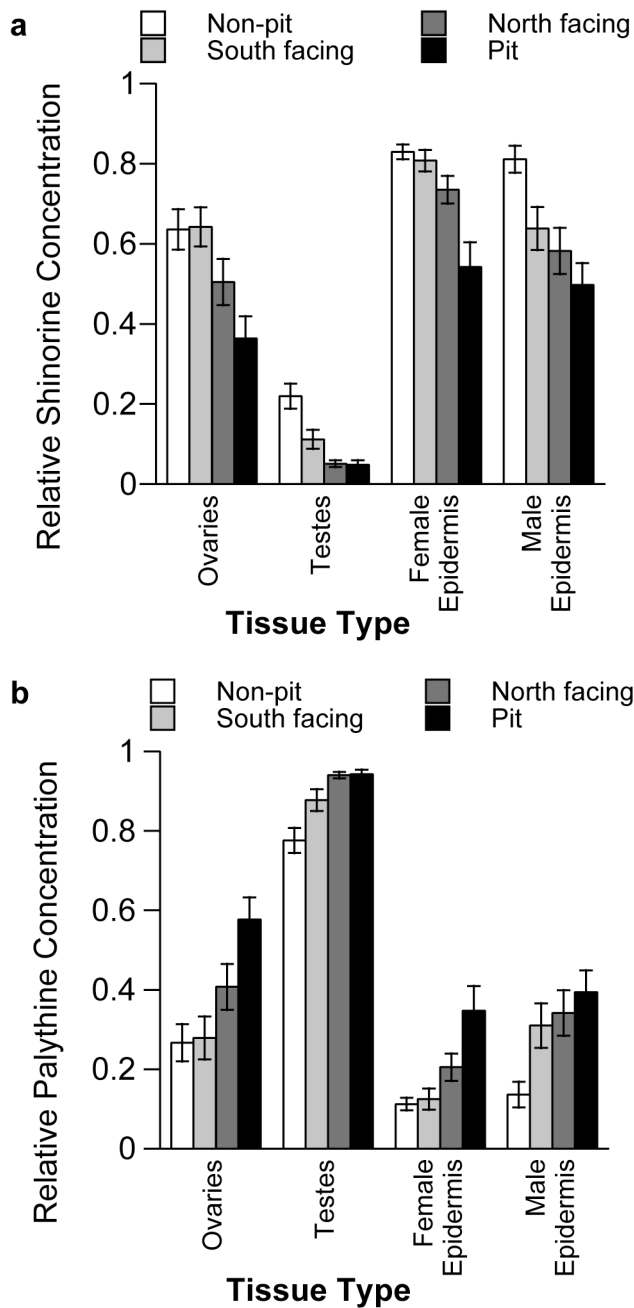
Source	<i>df</i>	<i>F</i>	<i>P</i>
Month	1	0.33	0.569
Sex	1	6.98	0.009
Microhabitat	3	7.87	0.009
Month * Sex	1	3.66	0.057
Month * Microhabitat	3	1.39	0.247
Sex * Microhabitat	3	4.46	0.005
Month * Sex * Microhabitat	3	3.14	0.026

**Table S3** Restricted Maximum Likelihood (REML) analysis of fixed effects using sequential sums of squares for the proportion of MAAs in epidermal tissues of *S. purpuratus*. The dependent variable is the concentration of epidermal MAAs/ [concentration of epidermal + gonadal MAAs], N = 238

Source	<i>df</i>	<i>F</i>	<i>P</i>
Month	1	1.99	0.160
Sex	1	0.01	0.912
Microhabitat	3	2.54	0.131
Month * Sex	1	3.25	0.073
Month * Microhabitat	3	0.72	0.542
Sex * Microhabitat	3	2.95	0.034
Month * Sex * Microhabitat	3	2.26	0.082



**Fig. S1** The mean ( $\pm$  SE) relative concentration of shinorine to total MAAs in algal samples ( $[\text{shinorine}]/[\text{total MAAs}]$ ,  $N = 35$  for the Non-pit,  $N = 25$  for the South and North facing, and  $N = 33$  for the Pit microhabitats). Though no statistical differences among microhabitats were found (REML,  $F_{3,105} = 1.86$ ,  $P = 0.221$ ), the relative concentration of shinorine in algae from the Pit microhabitat was low and the Non-pit microhabitat was high, similar to the pattern found for the sea urchins (Fig. S2)



**Fig. S2** The mean ( $\pm$  SE) relative concentration of a) shinorine and b) palythine compared to the total concentration of MAAs ( $[\text{shinorine or palythine}]/[\text{total MAAs}]$ ) among the microhabitats for the separate tissue types of *S. purpuratus* ( $N = 29$  for females tissues and  $N = 30$  for male tissues for each microhabitat). The relative concentrations of shinorine and palythine ( $[\text{shinorine or palythine}]/[\text{total MAAs}]$ ) varied by microhabitat (REMLs,  $F_{3,462} = 15.47$ ,  $P = 0.001$  and  $F_{3,462} = 12.50$ ,  $P = 0.002$  for shinorine and palythine, respectively). For shinorine, this trend was dependent upon sex (REML, Microhabitat  $\times$  Sex:  $F_{3,462} = 2.78$ ,  $P = 0.042$ ), but generally

the proportion of shinorine in each tissue type was higher in the sunnier Non-pit and South-facing microhabitats, but lower in Pit microhabitats. The opposite was true for palythine: the proportion of palythine was lowest in the Non-pit microhabitat but highest in the Pit microhabitat