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Interacting environmental stressors modulate reproductive output and larval performance in a tropical intertidal barnacle

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1 of 318



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Interacting environmental stressors modulate reproductive output and larval performance in a tropical intertidal barnacle

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Resumo

Tropical intertidal filter-feeding invertebrates often face thermal stress and oligo trophic nearshore conditions, which may modulate reproductive responses. In order to investigate how these stressors affect resource allocation for reproduction, we first acclimated experimental populations of the higher shore barnacle *Chthamalus bisinuatus* to different levels of food supplies, to obtain baseline reproductive parameters, and then submitted them to consecutive stress events, by transferring populations to chambers where temperature was either unchanged (25 degrees C) or increased to critical levels (45 degrees C). Thermal stress decreased overall adult survival by 15% and overall larval release by 53%, while no significant effects of food shortage were detected. Experimental populations after moderate short-term stress events (transfer to control chambers) showed anticipatory fitness effects by increasing both the quantity and the quality of larvae, which survived longer without an exogenous food supply. After severe stress, parents first decreased larval release rate (thermal stress) and then produced lower-quality larvae (thermal stress plus food shortage), compatible with a selfish strategy. Lipid analyses showed that adults are very efficient in retaining essential fatty acids (EFAs) and capable of fast accumulation of reserve lipids shortly after stress, which however decreased over the experiment. Chronic stress led to decreased transfer of reserve lipids to larvae, and increased transfer of EFAs, suggesting a compensatory effect on larval quality. Populations exposed to both stressors lacked these temporal trends and produced low-quality nauplii. Unexpectedly, parental manipulation seems to involve the allocation of EFAs, not reserve lipids, as usually reported for lecithotrophic larvae.

Palavras-chave

Palavras-chave de autor: Parental effects; Reproductive investment; Planktotrophic larvae; Life-history tactics; Reproductive strategy; Offspring manipulation; Rocky shore

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