
Chemical defenses under stress

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Abstract

Marine organisms are threatened by numerous potential antagonists: consumers, epibionts, parasites and pathogens. Many, especially sessile forms, rely on chemical mechanisms for their defense. Such defense is hypothesised to incur metabolic costs which may compete for limited resources with other budgetary items such as growth, reproduction or stress compensation. It can be assumed that the deployment of defenses is determined by both sides, the level of biological threat and the availability of resources. Both are variable. Grazing, fouling and infection pressure vary seasonally or sporadically. Resources vary with the availability of energy and nutrients, and their drain by competing pathways. When low resources coincide with high demand, the potential prey or host may succumb to the biological threat. When, in contrast, the fluctuations are "in phase", low resources coinciding with low pressure, high resources coinciding with high pressure, the prey or host organism may thrive. Global change including enhanced environmental stress, shifts of phenology or invasions by new antagonists may severely disturb any such evolved synchronization.

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