

A fluctuating salinity regime mitigates the negative effects of reduced salinity on the estuarine macroalga, *Enteromorpha intestinalis* (L.)

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ABSTRACT

We tested the response of *Enteromorpha intestinalis* to fluctuating reduced salinity regimes which may occur in coastal estuaries due to both natural and anthropogenic influences. In a full crossed two factor experiment, we subjected *E. intestinalis* to 0, 5, 15 and 25 psu water enriched with nutrients for 1-, 5-, 11- and 23- day periods. Each period was followed by 24 h of exposure to 25 psu (ambient) water that was not nutrient enriched. Following 24 h in ambient salinity water, algae were returned to reduced salinity conditions for the appropriate period and the cycle continued over the 24 days for which all treatments were maintained. Exposure to 0 psu for 5 days or longer resulted in loss of pigmentation, decreased wet and dry biomass, increased wet wt:dry wt ratios, decreased removal of nitrogen (N) and phosphorus (P) from the water column and an accumulation of NH₄ in the water column. More frequent exposure to ambient salinity in the 1-day treatment mitigated these effects. Across all salinity levels tested, biomass increased as frequency of exposure to ambient salinity increased. At all durations of exposure to low salinity tested, biomass increased as salinity level increased. We conclude that growth of *E. intestinalis* is decreased by reduced salinity. *E. intestinalis* is able to withstand exposure to 0 psu but there is a temporal limit to this tolerance that is somewhere between 1 and 5 days. Populations of *E. intestinalis* in coastal estuaries may suffer from freshwater inputs if salinity conditions are persistently reduced.

Keywords: California; *Enteromorpha intestinalis*; Estuary; Salinity fluctuations; Macroalgae; Reduced salinity

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