

Predicting the responses of seaweeds to ocean acidification: a physiological perspective

Catriona L. Hurd^a

^a*Institute for Marine and Antarctic Studies (IMAS), University of Tasmania, Hobart, Tasmania, 7005, Australia*



The responses of seaweeds to OA likely to be driven by the physiological mechanisms by which they take up dissolved inorganic carbon (DIC) from seawater, that is, their 'carbon-uptake strategy'. Many seaweeds actively (i.e. requires energy) uptake bicarbonate, using a CO₂ concentrating mechanism (CCM-species). The vast majority of CCM-species can additionally take up CO₂ by passive diffusion, which is considered an 'energetically cheap' method of CO₂ acquisition. However, about 35% of seaweeds, mostly Rhodophyta, can take up CO₂ only by diffusion and do not operate a CCM (termed non-CCM species). In a future high CO₂ ocean, range expansions are predicted for red seaweeds that use only CO₂, at the expense of habitat-forming brown seaweeds such as kelps. However, other environmental factors, especially light, temperature, water motion and daily pH fluctuations, interactively modify physiological responses of seaweeds to OA. In this talk I will discuss our ongoing carbon physiological research, including pH fluctuations, aimed at predicting how seaweeds will respond to a future high CO₂ ocean.