

NEWS FROM THE UNIVERSITY OF TASMANIA, AUSTRALIA

Media Release

Chiefs of Staff, News Directors

Monday, 30 May 2016

Honours research shows ocean acidification to slow kelp production

Research by an Institute for Marine and Antarctic Studies (IMAS) Honours student has found ocean acidification could jeopardise growth in one of the Southern Hemisphere's most widespread and abundant kelp species.

Published in the prestigious international journal *Nature Scientific Reports*, the research was conducted by Damon Britton during his 2014 Honours year in collaboration with other researchers from IMAS and CSIRO.

The study found that ocean acidification - falling pH levels in the ocean due to the absorption of CO₂ generated by human activity - is likely to affect the ecology and productivity of habitats dominated by the canopy-forming kelp *Ecklonia radiata*, which can be found from South Africa to southern Australia and New Zealand.

Mr Britton, the paper's first author, said pH levels within kelp beds fluctuate substantially due to *E. radiata* photosynthesising during the day and respiring at night, which benefits kelp photosynthesis and growth under current ocean conditions.

"Kelps play a pivotal role in providing habitat, food, and nursery areas for numerous species, and they strongly influence the understorey of invertebrates and macroalgae.

"When we simulated in the laboratory the daily pH fluctuation that kelp creates, rates of blade growth and photosynthesis of juvenile *E. radiata* increased compared with static pH treatments.

"This is the first documentation worldwide of seaweed metabolism being enhanced by daily fluctuations in seawater acidity."

However, Mr Britton said the positive effects of the diel (24 hour) fluctuation were not apparent when pH levels were reduced to simulate a future environment affected by ocean acidification, suggesting the kelp is physiologically adapted to current pH levels.

“These findings are important in helping us to predict the response of kelp-based communities to ocean acidification.

“Past research considered that habitats dominated by photosynthetic species such as kelp, seagrass and coral could act as a refuge for calcifying species such as crustaceans and molluscs because higher pH during the day might facilitate calcification.

“However, this refuge may be less effective than thought if, due to acidification, the diel pH fluctuations no longer benefit the kelp that are creating them.

“Further research is required to determine whether other widespread kelp species will respond to future pH changes in a similar way to *E. radiata*, or whether this is a species-specific response,” Mr Britton said.

Professor Craig Johnson, Head of the IMAS Ecology and Biodiversity Centre and a co-author of the paper, said it was a credit to Mr Britton that he’d carried out such notable research while an Honours student.

“Carrying out research of this quality would be an impressive achievement for an experienced scientist, let alone an Honours candidate.

“It’s even more remarkable that Damon has achieved the rare distinction of having his Honours work published in a journal as prestigious as *Nature Scientific Reports*.

“It’s a great example of how IMAS’s research expertise can benefit our students by giving them access to a world-class, multidisciplinary team to enable them to tackle major scientific questions of global significance.

“This capability, along with Hobart’s recent role as host for the 4th International Symposium on the Ocean in a High-CO2 World, helps to put IMAS and Tasmania at the forefront of ocean acidification research,” Professor Johnson said.

The *Nature Scientific Reports* paper, “Ocean acidification reverses the positive effects of seawater pH fluctuations on growth and photosynthesis of the habitat forming kelp, *Ecklonia radiata*”, is available at <http://www.nature.com/articles/srep26036>.

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