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Near-future levels of ocean acidification reduce fertilization success in a sea urchin

Jon N. Havenhand¹  ... Jane E. Williamson²

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Summary

Although it is widely believed that seawater is chemically well-buffered, CO₂-induced acidification of the world's oceans threatens the viability of many species [1](#), [2](#), [3](#). Research to date has focused on the responses of adult stages of calcifying taxa to gross pH changes relevant for the years 2200–2400 [3](#), [4](#). We investigated the consequences of exposure of gametes and larvae of the sea urchin *Heliocidaris erythrogramma* to CO₂-induced acidification by ~ 0.4 pH units (the upper limit of predictions for the year 2100 [\[5\]](#)), and found statistically significant reductions in sperm swimming speed and percent sperm motility. We predicted the effects of these changes using an established model [\[6\]](#), and tested fertilization success experimentally in assays using the same gametes and pH treatments. Observed reductions in fertilization

success corresponded closely to model predictions (24% reduction). In general, these findings have important implications for the reproductive and population viability of broadcast spawning marine species in the future acidified ocean.



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