Carbon dioxide poses risk to marine life survival

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Heliocidaris erythogramma.

(PhysOrg.com) -- Climate change and the subsequent acidification of the world's oceans will significantly reduce the successful fertilisation of certain marine species by the year 2100, an international team of biological scientists has found.

A team from Macquarie University's marine ecology group, led by Dr Jane Williamson, joined forces with the University of Gothenburg in Sweden to study the effects of seawater acidification on sea urchin fertility for the first time, finding a link between decreased pH (increased acid) levels and a reduction in sperm swimming speed and motility.

Williamson said sea urchin gametes and larvae used in the research were exposed to the same acid levels that are predicted to be present in the

world's oceans by the year 2100.

The surface of the ocean absorbs up to 30 per cent of the yearly emissions of carbon dioxide. This absorbed carbon dioxide dissolves in the water and forms a weak acid that is gradually increasing the acidity of the oceans.

"It is widely believed that seawater is chemically well-buffered, but these results show that the acidification process already well underway may threaten the viability of many marine species," Williamson said.

"Our results show that carbon dioxide-induced acidification of seawater, at levels predicted for the year 2100, reduced fertilisation success of an ecologically dominant marine species by 25 per cent."

The Macquarie University research is especially significant, as equivalent results have only previously been found at far more extreme levels of acidification.

"What we have now is evidence that the world's marine life is far more sensitive to ocean acidification than first suspected, and that means our oceans may be very different places in the not too distant future," Williamson said.

Researchers measured sperm swimming speed, sperm motility, fertilisation success and larval developmental success in individual male x female crosses in the Heliocidaris erythrogramma species using control (pH 8.1) and acidified (pH 7.7) seawater.

The Heliocidaris erythrogramma species is found commonly in inshore waters around south-eastern Australia.

The findings of the Macquarie University study will be published in the

August 5 issue of science journal, *Current Biology* (www.current-biology.com).

Provided by Macquarie University