The Impact of Ocean Acidification on Lytechinus variegatus Fertilization & Development

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Ocean acidification is a stark reality and is only predicted to increase. This research will evaluate how future increase in acidification will affect organism's reproductive abilities. Sea urchins have a significant role, ecologically and in the lab. The sea urchin developmental model can be used to represent how ocean acidification affects other species. Due to the sensitivity of the urchin's gonads, all three different experimental crosses will reveal inhibited fertilization and development. The female will be more affected than the male due to extra complexities in the egg. 80 urchins were collected from the Sarasota Bay, the control group was acclimated to a normal bay pH 8.2, experimental group to a pH 7 to simulate ocean acidification. Lytechinus variegatus were induced to spawn with a 2 ml of 0.5M KCl injection. The crosses are: experimental egg/experimental sperm, control egg/control sperm, control egg/experimental sperm, and experimental egg/control sperm. 10 pictures were taken of each developmental phase for quantitation. It was found that on average the development to blastula phase for each group was, 71.66% control, 58.04% experimental egg/control sperm, 23.42% control egg/experimental sperm, and 2.06% experimental. The control showed about 72% development compared to only 2% development in the experimental. This shows that these organisms ability to reproduce is greatly inhibited and chances are if development was observed into further and more complicated stages none of the offspring would survive. This demonstrates a serious need for change and confirms that we cannot allow ocean acidification to continue on the path its taking.

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