Biogeosciences Discuss., 7, C3003–C3004, 2010
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Biogeosciences Discussions

Interactive comment on "Effect of ocean acidification on marine fish sperm (Baltic cod: *Gadus morhua*)" *by* A. Y. Frommel et al.

Anonymous Referee #3

Received and published: 26 September 2010

Authors studied the effects of acidification on sperm motility in a marine fish cod. Their findings showed no significant effects of pH at 7.55 on sperm motility.

Abstract should contain results and major findings of the study and a conclusion. The first six lines are an introduction, could be omitted. Please describe what are effective acid-base regulatory systems in adult fish? To study the role of pH, at least 3 different values of pH are needed to test! Most of the study published on fish sperm, showing effects of pH at <7.0. I will recommend to decrease pH to 7 and even 6.5. Which results become achieved if you remove effects of males in statistical analysis? I not sure that it is a good idea to look for the effects of males when you are talking about the effects of acidification? However, if the effect of males is included, authors should discuss it. This sentence used in discussion is absolutely incorrect; "The pH of cod

seminal fluid lies between 7.9 to 8.4 (Suquet et al., 2005) and therefore, lowering the pH of the surrounding activating fluid to 7.55 should prevent the triggering of sperm motility (Cosson et al., 2008; although the review by Alavi and Cosson, 2005, states that the pH of the swimming medium has little influence on sperm motility)." It is wrong to say that pH lower than that of the seminal plasma should prevent initiation of sperm motility. Alavi and Cosson (2006) did not say this hypothesis. In this article, the authors clearly talk about a pH-independent mechanism that trigger the of sperm motility in most of the fish. The most important parameters are osmotic or ionic depend signals. Another point is the effects of ions in the activation medium, which probably remove the effects of pH. There are a lot of different cations (especially Na+, Ca2+ and K+) in seawater used for activation of sperm in this study. I will recommend using different types of activation medium to follow up the effects of pH, for example sucrose based activation medium, sweater based and NaCl based activation medium. Then change the pH by Phosphate buffer and look for the effects of pH. So far, the effect of CO2 has been shown in flat fish sperm motility. Authors discussed a nice research published by Inaba et al., 2003. I did not see such a effects on cod sperm. In addition, I believe the initiation of sperm motility in cod is an osmotic-signal dependent following the activities of ion channels that lead to axonemal beating. A technical note about the evaluation of sperm motility in marine fish is their stickiness into the slides if you do not avoid it using for example bovine serum albumin (BSA).

Interactive comment on Biogeosciences Discuss., 7, 5859, 2010.