

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

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General comments

This paper clearly demonstrated insignificant effects of 1400 ppm CO₂ on sperm speed or motility of the Baltic cod. The experiment seems to have been carefully done and results are straightforward. However, Inaba et al. 2003 already found that motility arrest of fish sperm by CO₂ is only found in flatfish species but not in other teleosts including freshwater and seawater species. What is then new information we can learn from this study? I would recommend the authors to compare their results with those published data (probably used CO₂ levels higher than projected future atmospheric CO₂), and discuss the importance of their own findings.

C2736

It is somewhat curious to see that the authors did not discuss their earlier data on a sea urchin and an oyster, in which low seawater pH had significant effects on sperm only in the urchin but not in the oyster. Question here is why sperm of some animals are CO₂-sensitive but those from other animals are not? Do the authors have some information about this point?

The manuscript contains several errors which should be corrected.

Specific comments

Page 5863 line 2-4: How many sperm were observed for each replicate?

Page 5863 line 3: What is the “motile sperm direction”?

Page 5863 line 13-14: It is stated that mean control SW pH was 8.056 and acidified SW pH was 7.554. These values are different from those given in Table 1 (8.080 and 7.558 calculated) and in Table 2 (7.929 and 7.504 measured). Which is correct? Why calculated and measured values differ this much?

Page 5863 line 14: “36-50 cm” is standard or total length?

Page 5864 line 24: Alavi and Cosson 2005 is not a review paper and does not say “the pH of the swimming medium has little influence on sperm motility”. This is probably another Alavi and Cosson 2005 paper in Cell Biol. Int. 29, 101 “Sperm motility in fishes. I. Effects of temperature and pH: a review”?

It is confusing here. In line 19, it is stated that the external pH is of crucial importance... (Alavi and Cosson 2005, 2006), which is opposite to the statement in line 24 but referring to the same Alavi and Cosson 2005 paper. Which is correct?

Page 5865 line 2-6 According to Inaba et al. 2003, fishes other than flatfishes did not show inhibition of sperm motility in elevated CO₂ conditions. Then, what is the new information we can learn from this paper.

Table 1

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This table is not commented upon in text.

There are two fish with #7.

pHC is quite different between fish #1-#7 (7.858) and fish #8-#18 (7.985). Why?

How was the sperm swimming speed determined? These data are means of 5 replicates for each fish?

Table 3

Are the numbers of df correct? Why not integers?

Technical corrections

Page 5863 lines 14 and 16 "Table 1" should read "Table 2".

Page 5863 line 22 and Page 5864 line 3 "Table 2" should read "Table 3".

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