Biogeosciences Discuss., 8, C3783–C3784, 2011
www.biogeosciences-discuss.net/8/C3783/2011/

Biogeosciences Discussions

Interactive comment on "A gender bias in the calcification response to ocean acidification" *by* M. Holcomb et al.

Anonymous Referee #2

Received and published: 25 October 2011

General Comments: This paper describes an experiment designed to test the effects of nutrients and CO2 on zooxanthellate and azooxanthellate corals (Astrangia poculata) at two different temperatures. The main conclusion and discussion points (not to mention the title) are based on an interesting observation that was made during the course of the experiment – that gender and spawning may influence a coral's susceptibility to ocean acidification. While this is a novel and fascinating observation, the experiment was not designed to test this question. As it stands, the manuscript lacks focus (i.e., a clear story) because the experimental design and methods are presented to test one question yet the title and discussion revolve around a separate, unrelated observation.

Specific Comments: The rationale/objective should be more clearly stated in the introduction. The authors state that the objective is to test interactions between mul-

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tiple stressors, and it also seems to follow up Holcomb et al. 2010 to test if nutrients/symbiosis (i.e., nutrition) mitigate ocean acidification stress at different temperatures. The experimental design is complex, and the researchers do not include replicate aquaria for each treatment. Unfortunately, the analysis of results is complicated by the presence of different genders that exhibited varying growth patterns due to the fact that they were spawning. The many confounding factors limit the ability of the authors to address the main objectives of the study. The discussion of the results pertaining to the experimental objectives is limited to one paragraph and should be expanded.

Nonetheless, the observation that female spawning corals may be more susceptible to ocean acidification than male spawning corals is novel and deserves further attention. It's interesting that even with pooling groups that experienced different experimental conditions, and with relatively low replication, the gender effect was highly significant. The implication that gender, particularly during spawning, greatly influences growth rate and acidification response, is a finding that should be brought to the attention of the scientific community – as the authors mention, not just with respect to corals but with implications for many dioecious calcifiers. To my knowledge, this is the first manuscript to describe gender differences in acidification-sensitivity, and it should be followed up with a more adequately designed experiment.

Interactive comment on Biogeosciences Discuss., 8, 8485, 2011.