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Interactive
Comment

*Interactive comment on* "Modulation of ecdysal cyst and toxin dynamics of two *Alexandrium* (Dinophyceae) species under small-scale turbulence" *by* L. Bolli et al.

L. Bolli et al.

Received and published: 16 May 2007

Response to Anonymous Referee #3.

A) Referee comment (S471): "I wonder about the relevance of the shaker experiments to natural populations as epsilon is very high 27 cm2s-3 and the duration is long."

Response: 1) Ours is, essentially, a physiological study. Many of the physiological processes (e.g., phtosynthetic, metabolic) have being unveiled by forcing the capacity of the organisms by different factors (light, temperature, unique molecule supplies, ...). Unfortunately, laboratory can not mimic nature. And we are aware of this. Concerning cyst production, a reduction is immediately observed since the first day of exposure to shaking either during the exponential (Figure 1C ) or the stationary (Figure 1D)

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phase of the culture, and lasting during the 4 days of shaking in those two treatments. This response is somehow confirmed by a) comparing to unshaken control (Figure 1B) flasks or b) by shaking for a long period (Figure E) besides it is unrealistic. It is in this sense, that we understand the physiological study. This trend has been observed in the two species exposed to high turbulence. Only one is shown (in part due to page charges), but a summary of the data could be included in a table, along with the data from the experiments performed with vertically oscillating grids.

2) In general, the experimental study of small-scale turbulence in the laboratory is limited. The almost sphaerical Florence flask are very suitable for phytoplankton studies. Their volume is compatible with performing different biological samplings. Unfortunately, they need to be agitated by an orbital shaker where turbulence is generated at high speeds, with the high epsilon. At lower speed, the liquid moves uniformly, and it is not turbulent. Another reason to choose this setup is that we wanted to compare with previous data. The response is highly dependent on the experimental design and it is species-specific. The grids have also been used by us previously. Thus, overall the presented results can be directly compared by our previous studies (as indicated in the Introduction and Discussion).

3) Of course, the desired next step, is to validate it with natural data. But it is, still, more difficult.

B) Referee comment (S471): Results on GTX inconclusive, given the large error.

Response: We can add this comment, and focus on Cx, that has a more clear response pattern.

C) Referee comment (S471): "There is no sufficient information to evaluate the calculations of epsilon".

Response: It is true. The detailed study, "Evaluation of oscillating grids and orbital shakers as means to generate isotropic and homogeneous small-scale turbulence in

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laboratory enclosures commonly used in plankton studies", is submitted for publication to Limnology and Oceanography Methods, and the authors (Guadayol, Peters, Stiansen, Marrasé, Lohrman) wait for the comments for their revised version. Meanwhile, in a previous work accepted in Journal of Phycology we provided more information, as explained in the response to referee 1 (RC S435).

D) Referee comment: p. 900, line 10. The growth rate in the plexiglass cylinders is significantly higher only in the case of A. catenella, not in A. minutum.

Response: We can add the suggested comment.

E) Referee comment: To represent data points and to draw a "guide line" crossing the mid values of two data points.

Response: We can do as suggested, although in our opinion, it is more clearly shown as is.

Elisa Berdalet 16th May 2007

Interactive comment on Biogeosciences Discuss., 4, 893, 2007.

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