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Comment

## ***Interactive comment on “Food quality regulates the metabolism and reproduction of *Temora longicornis*” by R. Nobili et al.***

**Anonymous Referee #1**

Received and published: 2 March 2013

Please revise according to the suggestions and comments below.

P 3204:

are C:P and C:N ratios merely “indicators” of food quality or are they actually determinative of food quality?

“with a food quality of 16N : 1P” ????? strange phrase. You should say “with and N:P ratio fo 16”. I can’t see how “food quality” can have units of N:P ratio!

“the Threshold Elemental Ratio (TER)” This is NOT how TER is defined according to existing stoichiometry theory. TER is the C:X ratio above which growth becomes X-limited. At this point in abstract better to just say that 16:1 defines the optimum diet for *Temora*.

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Discussion Paper



“phytoplankton organic N : P ratios can change on decadal timescales” They can also change on time scales much shorter than decadal!

P 3205

Again, C:P and C:N ratios are not necessarily merely “indicators” of quality. But in many cases they are the DETERMINANTS of quality. That is, high C:P ratio means that that P is diluted into too much C, making it impossible to ingest P at a sufficient rate to maximize growth. But of course, as Tang and Dam (and others point out) often other things (such as PUFAs and amino acids and sterols etc) are co-varying with C:nutrient ratio.

“The global average elemental ratio of particulate matter of 106C : 16N : 1P, known as the Redfield ratio”

Average where? Of particles IN THE OCEAN. Please specify.

Also, you need to specify that these are atomic ratios.

“is considered to provide a balanced diet for copepods, with nutrient limitation occurring above and below this ratio.”

Considered by whom? Citation? I thought that this study was the first to show this! If this property of food N:P is so well-known, then this manuscript should have low priority. (I don't actually think anyone has provided strong evidence that copepods have maximal growth on food with N:P of 16).

“phosphorous” !!!! here and elsewhere. Please spell correctly. “phosphorus”. <http://www.nature.com/nature/journal/v426/n6963/full/426119c.html>

“phosphorous constitutes less than 1 % of the total dry biomass of copepods”

Not always the case. Some copepod stages can have %P higher than 1% . Please consult literature.

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10, C182–C185, 2013

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Comment

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Interactive Discussion

Discussion Paper



Overall comment on literature coverage in Introduction:

It's very strange that very important papers on effects of stoichiometric food quality on zooplankton growth are not cited, including papers that call attention to unimodal shape of growth rate response to stoichiometric food quality.

For TER:

Urabe, J., & Watanabe, Y. (1992). Possibility of N or P limitation for planktonic cladocerans: an experimental test. *Limnol. Oceanogr.*, 37, 244–251.

For unimodal function: Plath, K., & Boersma, M. (2001). Mineral limitation of zooplankton: Stoichiometric constraints and optimal foraging. *Ecology*, 82, 1260–1269. Boersma, M., and J.J. Elser. 2006. Too much of a good thing: on balanced diets and maximal growth. *Ecology* 87: 1325-1330.

Methods

Duration of feeding rate incubations?

“a specific seston N : P Threshold Elemental Ratio” again, this is a non-standard use of “Threshold Elemental Ratio”

Results

P 3213

The writing is switching between past tense and present tense. Please stick to past tense.

“a nutrient limited diet (9.8 : 1 N : P)” If 9.8 is a “nutrient-limited diet”, then what is N:P of 22 (where growth is also low)? Just say “low N:P diet”.

Discussion

P 3217: again, this is not how TER is classically used. TER is usually given as a C:X ratio and defines the onset of X-limitation. The authors need to deal with this issue and

C184

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Comment

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Interactive Discussion

Discussion Paper



introduce a different concept of this optimal N:P effect rather than co-opting TER.

“Therefore in this study, the poor nutritional quality of *R. salina* (i.e. lower and higher than 16.5 : 1) did not provide enough energy and specific nutrients essential for egg production, inhibiting growth.” I don’t see how the authors draw this conclusion. Feeding rate did not change with N:P, so energy intake was presumably unaffected by N:P. So, in that sense how did “the poor nutritional quality” fail to provide “enough energy”? (And, for that matter, how can “poor quality” provide anything, actually, much less energy? Sloppy writing here.)

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Interactive comment on Biogeosciences Discuss., 10, 3203, 2013.

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