

## ***Interactive comment on “The “neutral” community structure of planktonic herbivores, tintinnid ciliates of the microzooplankton, across the SE Tropical Pacific Ocean” by J. R. Dolan et al.***

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General comments: The cruise track and sampling in this study duplicate those of some rather famous early 20th century campaigns. This in itself makes the paper noteworthy and interesting to read. Furthermore, this subject is very timely because of the current debate on the degree of cosmopolitanism among microbes, tintinnids included. Several interesting and important findings are reported.

First, the authors observed the same high level of species richness reported from this area by Kofoid and Campbell nearly 100 years ago. This is reassuring, I suppose, in an era of global change in which biological diversity is apparently on the wane.

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Second, while the level of species richness (149 species encountered) might not astound someone who is studying diversity in, for example, tropical copepods, the fact that this represents perhaps 15-20% of all described tintinnid species is extraordinary. This generally supports the idea of cosmopolitanism and circumglobal distributions in ciliates.

Third, the comparison of models for “community assembly” is also striking in that it supports the idea that local communities are maintained principally by dispersal from remote populations, and that there is no evidence for competition between species. While this is only one observation that requires additional evidence to be convincing, it does suggest that randomness and the power of huge absolute population sizes cannot be ignored as explanations for community composition in eukaryotic microbes.

All of these interesting points are diluted somewhat by the “tintinnid taxonomy problem”. The latter arises from the fact that virtually all tintinnid taxonomy is based on lorica morphology, a character that has been shown repeatedly to be highly plastic within species. Kofoed and Campbell (1929), the ultimate “splitters” in ciliate taxonomy, were confident enough in the utility of the lorica as a taxonomic character that they erected 276 new species (of 726 total) based on very small details of lorica shape and morphometrics. However, if the current global species list of tintinnids is correct, then tintinnids represent about 10-15% of all ciliate species, begging the question, “Why was the Creator so fond of tintinnids?” An alternative explanation, of course, is that tintinnid loricas are not useful for taxonomy and that tintinnids have thus been overdescribed (Alder 1999). In the context of the present manuscript, it is hard to imagine such a speciose group being composed of members that are not under strong competition most of the time. Since the time of Darwin, the process of speciation has been conceptualized as a series of steps starting with geographic isolation, competition, character displacement, and reproductive isolation (e.g. the famous finches). How then can we conceive of such a process in tintinnids, who like other microbes, appear not strongly subject to geographic isolation and who appear (from the present study) not to be subject

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to competition either? This is the paradox of the current “Is everything everywhere?” debate. We are finding that there is indeed a strong degree of cosmopolitanism in microbial eukaryotes, but also that there is a huge diversity among these organisms. So, everything IS everywhere, but there are a whole lot of everythings! How can we reconcile high dispersal/gene flow AND high global diversity, with the observation that at a local level communities are assembled at random, not structured by competition or disturbance? Well, first we have to verify that described species of tintinnids are truly isolated gene pools, occupying different niches. Dolan has tried to address this in earlier papers by quantifying functional diversity in the form of oral diameters (OD), presumably related to food niche. However, there is no evidence from the current ms that OD relates strongly to distributions or phytoplankton size spectra. Obviously, what is needed is a broader molecular database that will allow us to test the correspondence between lorica morphological variations and real genetic distances. Until we have that information, the seemingly extreme diversity of tintinnids will be provocative rather than definitive.

Some technical comments: 1. I’m not sure that “Tintinnoinea” is still an appropriate taxon, though people still use this term, presumably because of Kofoid and Campbell. Lynn and Small (2000) refer to this group as the order Tintinnida (within the subclass Choreotrichia).

2. page 564, line 11 Heinbokel is spelled wrong.
3. page 565, line 23, I think probably the tube was PVC?
4. page 567, line 23, need an “or” statement to go with the “either”
5. page 570, line 5, lowest chl values are 0.08, not 0.8.
6. page 574, line 21: I think “specious” should be “speciose”

## REFERENCES

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huys, Leiden, p 321-384

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