

Biogeosciences Discuss., author comment AC1
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Reply on RC1

Martin Vohník

Author comment on "Bioerosion and fungal colonization of the invasive foraminiferan *Amphistegina lobifera* in a Mediterranean seagrass meadow" by Martin Vohník, Biogeosciences Discuss., <https://doi.org/10.5194/bg-2020-452-AC1>, 2021

This is an interesting and novel manuscript and reports on the vital status, destruction/decomposition and mycobiota communities of *A. lobifera* in the rhizosphere and on epiphytic shells from the Mediterranean seagrass *Posidonia oceanica*. The novel aspects concern the study of the mycobiota on living and dead shells of the foraminifer *Amphistegina lobifera* (as epiphytes and as dead shells) and within the rhizosphere of *Posidonia oceanica*. While the analysis of seagrass roots yielded 81 identified isolates, the surface-sterilized substrate specimens revealed no cultivable fungi. Only 16 identified isolates were obtained from the epiphytes.

The manuscript is well written and provides new insight into the fate, destruction and bioerosion of foraminiferal shells.

Three sites were investigated, where shells of the epiphytic symbiont-bearing foraminifera live on the seagrass and eventually accumulate in the sand. The sediments were found to eventually accumulate dead shells of *Amphistegina*, but the shells do not (yet) accumulate as thick layers, as has been reported from other sites in the eastern Mediterranean Sea.

Author's Response (AR): Thank you – being a novice in the foram field, I am glad that what I did in this study makes sense/is interesting not only from the mycological perspective.

As such, I find that the title of the ms does not reflect the content of this paper for the 3 reasons outlined below:

- The focus of this study is on mycobiota communities and bioerosion
- The *Amphistegina* rich deposits do not form thick sands (yet), as reported from other sites in the eastern Mediterranean Sea
- The sands are not "dead", as they contain abundant other living organisms including living foraminifera (but not studied here).

*AR: True – I changed the title of the ms to "**Bioerosion and fungal colonization of the***

invasive foraminiferan Amphistegina lobifera in a Mediterranean seagrass meadow

Technical issues concerning the sampling methods:

The sampling procedure for the collection of epiphytes is not well described and as such it is difficult to replicate this study (how many leaves were collected, how were the epiphytes collected? Collection of the epiphytes by placing a bag over the leaves or by just cutting the leaves makes a big quantitative difference. A clarification of this issue is needed.

AR: True – I added a more detailed explanation and the respective part of the ms now reads as follows:

*"The epiphytic specimens originated from *P. oceanica* leaves and seaweeds growing in the immediate vicinity of the seagrass (mostly *Dictyota dichotoma*) (Fig. 2c, d). The former was in situ scraped off the surface of the leaves using opened 50 ml plastic test tubes, the latter was individually collected with tweezers from the seaweed surface in the laboratory and both were eventually pooled (no attempt was made to calculate an exact seagrass : seaweed ratio but the majority of the epiphytic shells were from seaweeds). To obtain the rhizosphere substrate, *P. oceanica* rhizomes with intact healthy-looking leaves were gently lifted up a little and the substrate right below was collected into opened 50 ml plastic test tubes with seawater."*

The material analyzed includes not only leaves of *Posidonia oceanica* but also **other seaweeds** growing in the immediate vicinity. What are the other seaweeds? Epiphytic foraminifera communities may differ substantially when you collect them from different types of algae and seagrasses (see e.g. Langer 1993, Epiphytic foraminifera or papers by Kitazato).

*AR: Most if not all were *D. dichotoma* (see above). I did not focus on the total foram community but only on *A. lobifera* (that anyway represented the great majority of the epiphytes recognizable with the naked eye) with special emphasis on its substrate shells. The epiphytes were in a way a control treatment and I had expected a quite opposite result, i.e., the epiphytes (nearly) free of fungi vs. the substrate shells full of fungi (overlapping with those from the seagrass roots). After reading your comment (and given that the epiphytes yielded some interesting fungal isolates), I realize I should have been more precise, i.e., keeping + investigating the seagrass and the seaweed epiphytes separately. An inspiration for future!*

The references concerning the invasion of alien/invasive species of foraminifera, environmental engineers, carbonate production of tropical foraminifera are often "second hand" references and do not cite the original source/relevant papers. I have added numerous comments in the marked-up manuscript and suggested additional references.

AR: Perhaps true (being a novice in the field, I cannot really tell - I tried to gather as much knowledge as possible from all available sources) and thank you for the many suggested alternative references, I will factor them into a revised version of my ms.

Other than this, I find this paper to be of interest to a wide range of readers and recommend publication with minor/moderate revisions.

AR: Thank you. It is an interdisciplinary research and I hope it will be interesting not only for microbiologists/mycologists/marine ecologists etc. but also for the foram people.

Attached is my marked-up manuscript.

Martin Langer

Please also note the supplement to this comment:

<https://bg.copernicus.org/preprints/bg-2020-452/bg-2020-452-RC1-supplement.pdf>

AR: Thank you for your time and the fitting comments! Martin Vohník