bg-2016-254 Edit Suggestions and comments

Line 21: define "dominant" as compared to what? Phototrophs? OTUs? Biomass

Line 27: substitute "suggesting" for "calling for"

Line 44: MacIntyre et al, describe a two phase boring and subsequent new crystal formation within boreholes (within grains and connecting to adjacent) rather than external cementation of grains.

Line 48: m-2 d-1 and are of clear

Line 73: end sentence at "including genetic markers." Delete (a task yet to be undertaken with any breadth) or re-word at the beginning and add "To date" these genera were all assigned....

Line 77: suggest deleting "alternative" and edit to "complimentary and more comprehensive descriptions" of endolithic....

Line 79: delete "merely" and "morphological studies alone"

Line 81: delete "brought to our attention" substitute "have revealed"

Line 82: delete "not just composed of" substitute "in addition to"

Comment: this section on associations and succession patterns is well placed

Line 90: Suggest re-wording "However similar studies using the power of high throughput sequencing techniques are not yet available for the globally....."

Line 100: delete "could show" substitute we "found"

Line 101: delete "fastest" substitute "most rapidly"

Line 106: delete "arguments" suggest rewording "Similar substrate preferences have also been observed for phosphates"

Comment: lines 110 to 115, intriguing and compelling questions.

Line 112: Suggest re-wording. Perhaps, "We therefore developed the line of inquiry to ascertain if evolutionary specialization has resulted in a highly adapted....

Line 114: Suggest deleting sentence beginning with "Surprisingly, this aspect...."

The previous line is stronger without Line 114.

Comment: Lines 117 to 123, nicely and succinctly phrased.

Question, line 135: Was the geologic hammer sterilized before sampling? - See that sterilization steps were taken in the lab in line 157.

Line 137 and paragraph: seems awkward and a little confusing. What were replicates?

Perhaps "At each sample location three replicate aliquots of rock chips were collection in sterile 50 mL falcon tubes."

Presumably Air drying was done in the lab? And preservation in alcohol in the field?

Text should clarify this here. Also please specify how long in transit and transit conditions (light/ dark?/ .

Where were the seawater aliquots collected relative to the sample locations? (add to map in Fig 1.) and specify how handled/ stored and time to analysis.

Line 149: Could delete the word "retrieve"

Line 158: A chip was further "ground" not "grounded"

Line 161: was modified "by homogenizing bead tubes" delete "as follow" and delete "were applied"

Line 176: "were performed"

Line 182: "barcode" removal

Line 184: processed

Line 188: "further report specific abundances for each sample"

Line 189: Suggest "Because this study focused on the most abundant OTUs and how they vary, rather than the rare biosphere, we filtered....to remove the few? rare OTUs"

Question how many rare OTUs were present?

Line 207: Suggest, "For comparison, raw sequences....

Line 212: delete "they were" substitute "and also" delete "as well"

Line 222: "ran"

Line 254-256: worded a little awkwardly,

Line 290: communities "in this study" are much more complex than the majority of literature "to date"

Line 294: proven that "some axenic" cyanobacteria delete "alone"

Line 296: other metabolic activities (of other co-occurring microorganisms) particularly those that result in pH changes....

Comment Lines 307-320 Nice discussion

Line 349: delete "does" ie., "one that not only represents" an initial set of pioneers...

Line 356: delete "always" substitute (has "so often" been described...)

And delete "who can" substitute "accounting" ie., "community accounting for"

Line 360. "were" instead of "was"

Question: are attempts in progress to isolate *Plectonema terebrans*? And are isolates available from other sources?

Minor editing lines 385 to 403

Line 404 delete "It becomes clear that substrate preferences" suggest substitute "Results suggest substrate preferences are found..."

Some rewording of section line 410 to 414, probably split into two sentences

Line 417 suggest "although the paucity of samples restricted our statistical power, we were still able to identify..."

Line 422: suggest delete "promiscuous" which is vague substitute "widespread across different substrate types"

Comment: At the beginning of the manuscript "substrate preference" refers to clear numerical/ statistical occurrence (of particular endolithic cyanobacterial species relative to other species) in different mineral/ rock types. However at this point in the manuscript the term is "preference" is seeming to take on a more determinative meaning that is not yet demonstrated. Preference can be a tricky term to use. implying a more "decision based"

A particular species may seem to show a preference for a Mg or Ca cation containing mineral substrate based on occurrence/ density, but that does not necessarily imply a "preference" for Mg or Ca cations. That would need to be tested independently, as would the "preference" for anions.

The authors seem to understand this, but still sometimes fall into an overly interpretive phrasing implying metabolic/behavior from a distribution.

Certainly the data suggest some trends worth rigorously testing, (as has been done for *M. testarum* BC008) and it is critical to begin the determination of substrate preferences, by detailed investigations of naturally occurring distributions as the authors have done.

Line 447: in light of previous discussion would suggest changing "preference" to

"NR_OTU193) did show a higher rate of occurrence in calcium carbonates as compared to magnesium carbonate.

A careful re-reading and edits with particular emphasis on the implications and possible over interpretation of the term "preference" would be very beneficial.

Line 452: delete "we must assume" again data "suggests" but does not "prove"

Comment: Authors conclude that more factors may be involved in substrate preference that cation preference alone. A bit more discussion of what those other factors may be would be helpful.

Perhaps also in the introduction a short synopsis on thought / previous research as to "why" boring behavior is prevalent in some groups would be informative (ie., is behavior thought to provide protection from wave energy/ nutrients/cations/ light modification)?