

Institute of Science and Technology
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Klosterneuburg, June 12th, 2018

Dear Prof. Per Palsboll,

We are thankful for reconsidering our work. We have made the minor changes requested by the first referee. The new version has been uploaded onto the PeerJ website, together with a 'revised tracked changes' manuscript.

With best regards,

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On behalf of all authors.

Editor's Comments

MINOR REVISIONS

Please undertake the remaining minor revisions suggested by the referee.

Best regards,
Per [Palsboll]

Reviewer 1 (Anonymous)

Basic reporting

The manuscript has improved significantly; the suggestions were taken into account.

Experimental design

No comments.

Validity of the findings

The aim of the study and conclusions are now well explain and consistent with the results.

Comments for the Author

Thanks for your positive appraisal.

I only have minor suggestions:

Be consistent with the use of abbreviations and only introduce the terms once. For example, the term: joint site frequency spectrum (jSFS) is introduced together with the abbreviation in line 26 of the abstract, in line 30 of the same abstract, the entire term is used again. Similarly, you introduced joint site frequency spectrum (jSFS) in line 56 of the introduction but on the rest of the text, you mix the use of the term and the abbreviation, e.g., see lines 443, 454.

As you recommended, we now introduce the terms *joint site frequency spectrum* and *Approximate Bayesian Computation* only once in the Abstract and in the Introduction. And we use the abbreviations *ABC*, *jSFS*, *SFS* in the remaining of the text. Models and their abbreviation were introduced in the M&M. However, we preferred to keep employing both the full model names and their abbreviation in the Results, Discussion & Conclusion as this can be useful for readers not familiars with these models. The abbreviations were mostly helpful for the Tables and Figures.

The word “our” is used on several occasions. Avoid the use of that and instead, specify what it is such as the method, the specific results, etc. For example, line 283. “We checked our ability to...” It seems that it is the ability of the authors and not the ability of the ABC method. The same in line 363. Line 416. “our capacity...”, the authors capacity or is it the capacity of

the method?

You are right, our formulations were incorrect. We reformulated accordingly along lines:

- **268:** *We checked the ability of our ABC framework to correctly recover the true model by a “leave-one-out cross validation” from our simulations.*
- **346:** *(ii) on the ability of the method to discriminate between different speciation scenarios based on simulated datasets (Table S3).*
- **399:** *We further evaluate, by simulation, the effect of binning the jSFS on the capacity of the method to infer the correct speciation model (Table S3b).*

Line 459. The word “confirming” is probably not the most appropriate since Robinson et al., 2014 evaluated few and large number of individuals (2-50 individuals) but this study only few (2-8). Maybe you can use other word like “consistent with”, or you can write it in a different way in which you use the results from Robinson et al., 2014 to support the results from your data.

Thanks for the suggestion. We replaced *confirming* by *consistent with* on **line 440**.

The inferences based on the simulated data during the model checking and the inferences based on the empirical (mussel data) are now clear. I acknowledge the use of the word “simulated” to clarify. However, it is not necessary to completely remove the term pseudo-observed datasets (since it is a common term when referring to the data sets simulated for the model checking).

We agree with you, and so we put back the term *pseudo-observed datasets* in the legends of **Figure S2** and **Table S3**, and in certain places along the manuscript:

- **line 270:** *For each of the 100 of datasets simulated under a given model (i.e., pseudo-observed datasets),*
- **line 272:** *The accuracy rate for model M was calculated as the proportion, among pseudo-observed data inferred to correspond to model M, of those actually generated under model M.*
- **line 274:** *The ambiguity rate was computed as the proportion of pseudo-observed data generated under model M whose best model was not strongly supported*

Line 489. Which simulation results? Clarify. Is it simulated data generated as part of the model checking ABC framework or is it additional simulated data that was independently analyzed in ABC, such as the paper you are citing in line 495 which employs simulated data generated externally using Hudson’ ms?

We are sorry for the confusion, we were referring to the simulated data generated as part of the model checking. We now write on **line 470:** *Model checkings through simulations pointed out the loss of information when only four or seven classes in the jSFS were considered.*