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**Gesendet:** Donnerstag, 14. Februar 2019 11:45  
**An:** Lauchstedt, Andreas  
**Betreff:** Reject and Resubmit requested CORE-D-18-00302

Dear Mr. Lauchstedt,  
  
I have received the reports from the Topic Editor and the reviewers of your manuscript, "Reef coral traits predict extinction risk", which you submitted to Coral Reefs.  
  
Based on the advice received, my decision at this time is to reject your manuscript with an invitation to submit a revised manuscript.  The revision should be an extensive rewrite of the manuscript that carefully considers the reviewers' comments. Those comments can be found below.  If you decide to revise the manuscript, your resubmission will be sent out for review.  While the Topic Editor and I believe the concerns raised by the reviewers can be addressed, you should recognize that resubmitting your manuscript does not guarantee eventual acceptance.  
  
The revision should address all points raised by the reviewers and include a point-by-point reply to the comments of the reviewers and editor.  Your reply should be submitted as a separate "Response to Reviewers" file.  A version of the original manuscript with all changes marked (e.g. track change mode or colored text where changes have been made) should also be submitted as a "Track changes" file.    
  
In order to submit your revised manuscript, please access the journal web site:  
  
Your username is: AndreasL  
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We look forward to receiving your revised manuscript before 15 Apr 2019. Please contact the editorial office if you need additional time.    
  
Sincerely,  
Andrew Hoey  
Acting Editor in Chief  
  
  
COMMENTS FOR THE AUTHOR:  
  
  
Dear Dr Lauchstedt,  
thank you for submitting your manuscript "Reef coral traits predict extinction risk" to Coral Reefs. I have now received reports from two reviewers. Although the two reviewers differed in their recommendation regarding the suitability of your manuscript for publication in Coral Reefs, both raised substantive concerns about the manuscript in its current form. Collectively, the reviewers found the findings to be overstated, a lack of detail regarding the identity of the the species with new IUCN status, the mistreatment of geographic range and depth as species traits, the contentious use of IUCN categories to predict extinction risk, and the weak grounding of the manuscript in the existing literature. While reviewer 1 suggested that the manuscript would be better suited as a methods-style paper for another journal, I am willing to re-consider a substantially revised manuscript that addresses all of the concerns raised by the reviewers. If you decide to resubmit to Coral Reefs  
please respond to each of the reviewers comments individually and state explicitly what changes have been made. Please be aware that any revision will be sent out for further review.  
  
  
Reviewer #1: The manuscript by Lauchstedt et al. applies machine-learning techniques to coral traits and models IUCN threat categories. They conclude that a model based on four traits can accurately predict threat status and uses it to assign a status to previously data deficient species, and compare the susceptibility of fossil corals by applying the model to the Last Interglacial Episode.   
  
This manuscript presents a useful analysis, and I appreciate their consideration of coral traits to an applied problem, IUCN threat categories. However, I think the novelty of this work is oversold; all told, the analysis adds IUCN status for 77 previously data deficient species, 17 of which "showed no linkages to compilations of trait expressions" (L74-75), leaving 60 species with new IUCN status. Of these, the most urgent are the VU or EN categories (sensu Foden et al. 2013) - here, there are 21 and 8 species, respectively. But we are never told anything about these species in the main text - what are they? Does it make sense they are threatened? Fig. 1 suggests the main difference is geographic range - the reader is left wondering whether morphological or life history traits matter? In all, the authors need to provide a stronger reasoning for the conservation impact of the "formal incorporation into the of extinction risk may help improve the assessment of risk status of  
currently unevaluated species" (L51-53), otherwise this paper is better framed as a methods paper  
  
The analysis on the LIG paleo feels ad hoc; I am left wondering how an IUCN analysis of reefs thousands of years ago is a relevant comparison to the challenges faced by contemporary coral reefs. For example, the manuscript concludes with a consideration of paleo vs contemporary reefs that is a confusing ending to the manuscript. A broader conclusion to help put the main messages of the manuscript in context would benefit the reader.    
  
Overall, the manuscript feels weakly grounded in the existing literature and it is unclear what are the objectives of this work, or how this would move the field forward. Carpenter et al. 2007, Madin et al. 2016, Huang 2012 feel poorly developed in the Introduction and Discussion; I am left wondering why this manuscript's analysis is novel given the work already published on this topic.   
  
Minor comments  
  
Adding some indications of significant post-hoc analyses would be nice for Fig 1.   
  
Methods - Madin et al. 2016 has also demonstrated skewed taxonomic coverage of traits   
  
Why was growth form reduced to a binary variable or branching vs non-branching?? This seems like a gross oversimplification.   
  
L147-149 Why were these two particular species selected, re: "two extinct Caribbean species Pocillopora palmata and Orbicella nancyi (Pandolfi et al. 2001) was used to determine whether predicted extinction risk was actually greater than average for these species". Not clear why this is relevant.   
  
Section on single traits starting L228; how do findings relate to supertrait of Colony mass per area (CMA) proposed by Madin et al. TREE 2016? I think the authors can do a better job placing their research and discussion in the context of recent literature.   
  
References  
  
Carpenter, K.E., Abrar, M., Aeby, G., Aronson, R.B., Banks, S., Bruckner, A., Chiriboga, A., Cortés, J., Delbeek, J.C., DeVantier, L. and Edgar, G.J., 2008. One-third of reef-building corals face elevated extinction risk from climate change and local impacts. Science.  
  
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Madin, J.S., Hoogenboom, M.O., Connolly, S.R., Darling, E.S., Falster, D.S., Huang, D., Keith, S.A., Mizerek, T., Pandolfi, J.M., Putnam, H.M. and Baird, A.H., 2016. A trait-based approach to advance coral reef science. Trends in ecology & evolution, 31(6), pp.419-428.  
  
Madin, J.S., Anderson, K.D., Andreasen, M.H., Bridge, T.C., Cairns, S.D., Connolly, S.R., Darling, E.S., Diaz, M., Falster, D.S., Franklin, E.C. and Gates, R.D., 2016. The Coral Trait Database, a curated database of trait information for coral species from the global oceans. Scientific Data, 3, p.160017.  
  
  
Reviewer #2: The paper entitled "Reef coral traits predict extinction risk" by Lauchstedt et al. presents a test of the link between species-level metrics and their IUCN risk category. The findings are followed by a biogeographical analysis showing that low-richness regions (e.g. the Caribbean) contains the highest proportion of 'critically endangered' species, while regions of higher species richness (e.g. the Coral Triangle) may contain proportionally more 'threatened' species. Their model corroborates and updates the results of a previous study (Carpenter et al 2008 Science 321:560-563). The most novel and exciting component of the paper, in my opinion, is the use of models generated from the analysis to make inferences about the vulnerability of Pleistocene species that have subsequently become extinct. Nevertheless, while the quantitative analyses of the paper appear to be highly sophisticated, the interpretation of the results are, in my view, currently overstated or  
approached from the wrong angle. Below I outline major comments on the core themes of the paper (coral traits/extinction risk) that can help to address these issues. Most of the changes can be a achieved by modifying the wording of the title, abstract and main text. Since I am not familiar with neural network models/machine learning algorithms, I am not qualified to comment extensively on the statistical techniques used.     
  
Major changes:  
  
Coral traits: Two of the four traits analysed are not strictly traits (Maximum Water Depth and Geographic Range). Trait-based analysis has great potential in ecology and conservation but its impact relies on consistent understanding and definitions. The authors cite Violle et al. (2007) Let the concept of the trait be functional! Oikos 116:882-892 - a widely cited review that clarifies exactly what we mean by traits. In their study, Violle et al. conclude that traits are "Any morphological, physiological or phenological feature measurable at the individual level, from the cell to the whole-organism level, without reference to the environment or any other level of organization." While this review is widely cited by coral reef ecologists, it's key message is often ignored. Maximum depth and geographic range are not traits as they cannot be measured at the individual level. Instead they are components of species distributions. I am aware that these species distribution  
parameters are listed on coraltraits.org and have been described as traits in the coral reef literature (e.g. Darling et al. 2012 and elsewhere) but for the purposes of clarity this has to change. This means changing the title (for example, "Species distributions and traits predict IUCN conservation status in reef corals," or something similar), and modifying the text accordingly throughout the manuscript.   
  
Extinction risk: The utility of the IUCN categories for reef-building corals is a controversial issue that remains open for debate. Indeed, many believe that the information used to place species in IUCN categories is insufficient to determine extinction risk (even for species that are not listed as 'data deficient'). My suggestion, therefore, is to avoid stating that this study is a test of 'extinction risk' and more a test of the association between traits and IUCN categories. The title that I have suggested above ("Species distributions and traits predict IUCN conservation status in reef corals") is a good start, as it avoids stating upfront that you have measured extinction risk. The results of this study lend increasing support for the relevance of the IUCN categories as it seems they associate with attributes of corals that could be linked with extinction. At the same time however, the categories did not predict extinction for 1 out of 2 Pleistocene corals, suggesting  
that despite their association with key traits, the capacity of IUCN categories to predict extinction risk may still be limited. Statements of these results should be followed by a discussion of how the IUCN categories can be improved and the different metrics (traits or distributions) that are required to build a better picture of conservation status in corals.   
  
Minor comments:  
  
Lines 33-35: I'd remove the finding that 'Removing geographic range from the predictors slightly lowered the explanatory power' from the abstract, and replace with more critical results. What did the analysis of Pleistocene corals reveal? What about the biogeographic analysis?   
  
Lines 42-45: After taking a look at the supplement for Carpenter et al. 2008, it seems as though some 'traits' were included in their analysis to define IUCN categories (e.g. maximum depth). Does this mean that there is an element of non-independence in the analysis of the relationship between traits/distributions and IUCN risk, and if not why not? Please clarify here.   
  
Line 50-51: Surely climate change in combination with other stressors generates extinction risk?   
  
Line 105: Please define 'great circle distance.'  
  
Line 110: Does "Range area" refer to geographic area size in the CTD?  
  
Lines 154-156: What exactly is plotted inside these hexagonal grids? Proportions? Means?  
  
Line 163: Why wasn't growth rate used in the model if it had good correlation with threat status?   
  
Line 168: Perhaps repeat the list of the four traits again here.  
  
Line 265. What are the potential reasons for the disagreement between this study and Foden et al? I'd suggest that fast-growing taxa could be at lower risk of extinction if they are 'weedy' (i.e. have high reproductive output), suggesting that more complex life history traits need to be considered.   
  
Lines 275-277: Sentence starting with "Major advantages…" The statement about redundancy is wrong. The Caribbean has lower trait redundancy compared to most other regions, as demonstrated in a range of studies. There is no evidence that the phylogenetic patterns measured in Huang & Roy 2015 relates to symbiont diversity/coral trait diversity.    
  
Spelling/Grammar:   
  
Line 95: Spelling (\*functions). Also delete 'in the CTD.'  
Line 104: Delete 'directly'  
Line 138: Comma after 'test'  
Line 162: Delete 'a species could inhabit'  
Line 163: Insert 'the' before 'best'  
Line 164-166: Sentence beginning with 'Although' needs rewording  
  
  
   
  
  
  
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