Biogeosciences
Discussions

Interactive comment on "Influence of tree size, taxonomy, and edaphic conditions on heart rot in mixed-dipterocarp Bornean rainforests: implications for aboveground biomass estimates" by K. D. Heineman et al.

Anonymous Referee #1

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This is a very interesting and useful paper because this topic is generally poorly explored in current literature even though it currently has high importance and implications for forest biomass studies. The data set is large and unique and deserves attention by itself. I also liked the long history covered by the incorporated references in the article, making this article a source for anyone interested in this topic. The paper inspired me to try and study this topic as well......

Having said that, there is some room for improvement because some methodological points need some more detail. For example, the drilling method is not described clearly

enough, i.e. what size (diameter) drill was used (and make of the drill itself, or would any drill suffice?), and was drilling always continued until the centre of the tree, or stopped at a certain depth (perhaps depending on the length of the drill). This is important info because the drilling method is probably the easiest and most reliable method of detecting heart rot after felling, so people (like myself) may probably like to use this method.

Also because tree identify was the main factor determining wood rot severity and biomass loss, it would be good to have a list of tree species sampled with the observed values of wood rot frequency, intensity and biomass loss due to rot. This maybe useful to find associated species traits that can explain these observations.

Here are my comments in more detail: Abstract: Although I understand that the authors want to emphasize the new findings in the abstract, i.e. the influence of soil properties on stem rot, the main finding of this study remains that species identity is by far the most important factor! It could even have influenced (indirectly via species compositional patterns) the detected soil impact on stem rot. Therefore I think that emphasis has to be on the impact of species identity on stem rot. This will confirm the importance of including species traits (other than wood density) in estimating forest biomass values.

Introduction: Well written, no comments.

Methods: Chapter 2.2 Its a bit confusing that the species and stem numbers mentioned in the first three lines of chapter 2.2 differ from the ones mentioned in the reference to Table 1. It may be good to explain in the legend of Table 1 that this table only shows a selection of stems from a much larger data base of stems (and mention the selection criteria).

Also in chapter 2.2 the term commercial logs is introduced. It says this is based on the diameter and the length of the bole. However, does it also include a taxonomic component? In Bornean forests, mostly dipterocarps are logged commercially, i.e., I like to know if 1) all stems with the suitable dimensions were felled, or 2) only a

commercial subset of species (like dipterocarps) were felled and not other species.... Please make this clear in the text as it may influence the outcome of the study.

As the stem rot was determined as part of a bole (i.e. not the whole tree), how do you scale this up to whole tree estimates (like is done in the discussion). I didn't see any methodological explanation for this. The bole only represents an obviously important fraction of the whole tree biomass, but not all of it....

Please also explain the drilling method in more detail here

The selection criteria for inclusion of trees in the felling, drilling and coring methods remain to vague, please make this clearer. For felling, make clear what a commercial log is, for drilling make clear how many additional stems were added to the felling data base and how they were selected, and for the coring explain more about the spatial, diameter and species selection criteria.... Were the cored trees selected at random, were they placed within a plot, inside or outside the CTFS plot, etc....

Also give more info on the tree identities. It seems clear from the text that the felling and drilling data set had limited taxonomic resolution (i.e. lumping whole groups of species in broad categories like "red meranti" and so on), while the coring data base seems species specific.... Provide more information on this as it is vital for understanding the detected patterns of stem rot.....

Chapter 2.4 The soil associations of the tree species is based on species specific data (I presume). However, the felling and drilling data sets consists of species groups, not individually identified species (I deduct, because it is not clearly described, see previous comments), so how were these two linked?

Also, the Lambir plot has data on trees with dbh >=1 cm, while the Potts data made use of trees with dbh>=10 cm..... So was there a diameter cutoff used to determine species habitat associations? If not, the CTFS plot data may disproportionately affect the results of this classification as it has many more stems included due to the small

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diameter cutoff..... If this is true, than the soil association classification may not be so generally applicable as it is suggested, as it may mainly reflect the pattern observed in one particular plot in Lambir.....

Chapter 2.5 The soil classification used for the coring data set seems not very precise, and its classification is also not well defined (described). This may be a main reason why stem rot showed no response to soils in the coring data set.

Chapter 2.6 It may be better to move this to the end of the method section, i.e., switch with chapter 2.7, to make the story more readable.

Chapter 2.7 Here some info could be given on how to convert the biomass loss observed for logs into biomass loss of the whole tree and forest.....

Results Chapter 3.1 It remains unclear throughout the manuscript why coring would produce such different estimates from felling and drilling, especially as coring is almost identical to drilling (I would think).... What is causing this discrepancy? Is it really just a methodological issue or is something else going on?

How do you explain that there is no genus impact on stem rot in the coring data set? Would this be due to the larger groupings used in the felling/drilling data sets? I think these differences may stem from different levels of tree identification.....

I also don't understand why drilling and felling find a different impact of Wood density on the presence of stem rot.... Perhaps high wood density stems were excluded from drilling? I.e. again the selection criteria of trees may be important, hence it is crucial to describe these selection criteria in more detail.....

Due to the grouping of species in the drilling and felling data sets, I don't really trust the soil association outcomes.....

Chapter 3.2 PC3 in table 3 is reported as significant in the text, but is not in table 3.....

Overall, the result section can be shortened.... There were also several instances

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where the results were discussed in the result section... This should be removed.

Discussion Chapter 4 As with the abstract, I think the authors should emphasize their main finding more, i.e. the importance of species specific properties on stem rot....