



a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

The University of British Columbia
Vancouver Campus
Faculty of Forestry
2424 Main Mall
Vancouver, BC V6T 1Z4

Phone 604 822 1821
Fax 604 822 8645
Email y.el-kassaby@ubc.ca

Kirsten Thonicke, Ph.D., Associated Editor
Biogeosciences

April 18, 2016

Dear Dr. Thonicke,

Re: Manuscript reference No. bg-2015-371

Attached, please find the revised version of our manuscript entitled “Contributions of dynamic environmental signals during life-cycle transitions to early life-history traits in lodgepole pine (*Pinus contorta* Dougl.)” after considering the recommended changes.

Your comments and those of the reviewers were highly insightful and enabled us to greatly improve the quality of our manuscript. In the following pages, please find our point-by-point responses to the raised comments (Note that the comments of the reviewers have been addressed in our previous letter).

Revisions in the text are directly made with page and line numbers marked in our following responses. In accordance with reviewer’s suggestions, we have modified the manuscript as stated in our previous letter. We hope that you find the revised version meeting the journal’s high standards.

We look forward to hearing from you.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Yousry'.

Yousry A. El-Kassaby, Ph.D., R.P.F.
Associate Dean, Graduate and Postdoctoral Studies
Professor, Applied Forest Genetics and Biotechnology

Responses to the final comments

1. Reviewer comment:

P14107L23-34: Here you jump from paleoecological evidence to observations from the 1950... totally different things, I believe.

Our Reply:

"The core idea is that the environment plays an important role in seed size development. The palaeontology data give evidence that climate change may account for seed size variation, followed by studies of how the impact of environment on seed size variation gradually brings our attention. We attempt to emphasize the importance of environment on seed size variation from the perspective of palaeontology and previous studies."

Editor comment:

Please make sure in the revised text that you clearly refer to processes that apply to the palaeontological scale and to the ecological time scale so that the reader knows which process belongs to which time scale.

Response: Thank you for this constructive suggestion. Changes are made in the text P4L63-68.

2. Reviewer comment:

P14110L12: I am really not convinced that you need so many climatic variables. they will be highly correlated anyway, right?

Our reply:

ClimateWNA can easily generate many climate variables and each of them has its own specific meaning although many of them might be correlated. We wanted to take the full advantages of this program and let PLS to make selection among the climate variables. PLS is specifically suited for this purpose.

Editor comment:

It is important that you justify and explain in great detail in your revised manuscript what each climate variable contributes to the overall analysis. It is very convenient that the ClimateWNA software can generate many climate variables, but it needs to be of advantage for the scientific analysis and generate more insight.

Response: The relationships between plant and climate is complicated in most cases. A small number of handpicked climate variables are often not effective in building such relationships. On the other hand, using machine-learning algorithm like PLS, important climate variables can be identified through a process of model optimization. PLS regression is particularly suited when the matrix of predictors has more variables than observations, and when there is multicollinearity among X values. We took the advantage of ClimateWNA to generate a large number of candidate climate variables for PLS to choose from. Normally, there is no need to explain the contribution of climate variables in the initial input dataset as the importance of each climate variable is determined by the machine-learning process. This has become a common practice along with the advance in machine-learning algorithms and computing power. The above concepts have been integrated in the manuscript (P8L165-174).

3. Reviewer comment:

P14110L13: You should really explain what ClimateWNA does.

Our reply:

ClimateWNA has been widely used with over 200 citations according to Google Scholar over the past three years. The program downscales gridded PRISM climate data to scale-free point locations using partial derivative functions with respect to elevation. It also uses a delta method to downscale GCM climate data. Detail description of the methods can be found in Wang et al. 2012.

Editor comment:

Please make sure that your revised manuscript sufficiently explains the important functionality of the ClimateWNA software. Even though it has been widely used, it is important for the reader to know the essential functionalities to understand and interpret the presented results without consulting Wang et al. 2012. The Wang et al. 2012 publication may be consulted for additional information but not to understand the software in principle.

Response: We provided more basic concepts related to ClimateWNA software package (P7L135-138).

4. Reviewer comment:

P14110L20: Since you are using only one GCM, which is always risky and actually not very robust in terms of uncertainty, you should at least explain where in the range of CMIP5 GCMs CCSM4 is located.

Our reply:

CCSM4 is near the average in both temperature and precipitation increases for BC, the study area.

Editor comment:

Please make sure this is mentioned in the text and the quantitative difference to the average CMIP5 temperature and precipitation increase is provided.

Response: This information has been supplemented in the text (P7L145-146).

5. Reviewer comment:

P14119L20ff: Are these numbers of climate effects across different RCPs? then better to provide the range over the RCPs rather than the mean...

Our reply:

I don't know which line you denote. I guess it should be some line between L16 and L28. Through Fig. S8, you can see the mean and variance for each population. It therefore makes sense if the mean is used for general comparison. Otherwise, I should provide three ranges as per three RCP scenarios.

Editor comment:

Please clarify this in the text, when you refer to the mean for each RCP. But it is important that you also provide the range for each RCP. This is important to understand the influence of the range across climate projections where each climate scenario represents a different realization.

Response: Thanks for this professional suggestion. Revisions are made in P17L367-370. Additionally, the ranges across populations for each RCP is provided besides panels in Figure S8.