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Biogeosciences Discussions

Interactive comment on "Differences in spatial and temporal root lifespan of temperate steppes across Inner Mongolia grasslands" *by* W.-M. Bai et al.

Anonymous Referee #4

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In this manuscript the authors report the fine root lifespans of three typical Inner Mongolia grasslands based on the root monitoring period of two growing seasons and reflect results in regard to the measured soil traits, soluble sugars and aboveground net primary production. The authors conclude that the differences were mainly determined by contents of soluble sugars in roots. This is quite daring as the sugar concentrations were measured only once (?) during the study, at unknown time point, and from an unknown distribution and proportion of roots/species. The manuscript is pretty clear, although a lot of repetition, thus a linguistic revision would improve the fluency of the text. Also, there are quite a lot open questions regarding the materials & methods of the study and lastly, your review to the current literature could be a bit wider: you cite

14 times to McCormack papers although there are many other relevant publications from the area and also from the grasslands.

Abstract:

The abstract is good and clear. However, the sentence "Root lifespan.." (11-15) is clumsy and should be rephrased.

Introduction:

The paragraphs are very long. There are carelessness with the citations (e.g. citing to the first name, citing Mccormack / McCormack).

In the first paragraph, "Root" is a major source..?

In the second paragraph (18-28, I found disturbing the effusive use of linking words (However, In particularly, Therefore, However, Moreover, In addition). Their use is good as such but in the beginning of every sentence, it is too much. The sentence (13-17) should be rephrased. L22 stating that a few studies have quantified root lifespan & plant communities. . . you should refer to more than one article.

The last paragraph: what is this unit hm2? There is a lot of repetition: e.g. the word "grassland" recurs in EVERY sentence.

Materials and methods:

Data analysis and statistics: The number of 'selected roots' in the seasonal differences comparison is more than in the whole data? How can this be possible?

L10: You selected the root that were included in the analysis? Based on what? Or did you take three filming sessions for spring roots (1st, 15th and 30th)? Three filming sessions for the summer roots (1st, 15th and 31st)? What about the autumn roots? You should clarify a bit of these filming times.

I big concern is the short period of time between the last autumn filming (10.9?) and

the end of the study (20.10). There is only one month and ten days for those new-born roots to die. And according to your results (or maybe that is the reason?!), most of them will not as the lifespan for the autumn-born roots was the longest -> a lot of roots will be censored in the Kaplan-Meier analysis, weakening the reliability of the survival analysis. Or did you include only the roots from the first growing season autumn-filming? Should be clarified.

Results:

3.1 - This paragraph is hard to read. More reader-friendly way to present the differences of the sites would be to describe the sites by collecting the features together, like: Compared to the two other grassland S. breviflora seemed to represent slightly poorer soil conditions as it contained less water, inorganic nitrogen, soil organic matter and higher pH than the two other grasslands. Only regarding the potassium concentration and the soil bulk density, the sites did not differ.

3.2 – Mean lifespan? Why mean instead of median? Add also confidence intervals for the root ages.

3.3 - You had glass walls on the 0-10, 10-20 and 20-30 cm depths. You could report root distribution among these layers and in case there are enough roots, and check out whether the root lifespan remains same for the roots growing near the surface compared to the roots growing deeper in the soil? What about the root growth and the distribution on root diameters? Varying root diameters could also explain differences in root lifespan.

What are the exact numbers (and Cis) for the root lifespans for the seasons & sites? You don't give them not in the Fig 3 nor in the text.

According the Fig. 3 all roots born in the first spring died in three months; so I guess this curves in the figure 2 (a) includes both spring-born roots from the both years? You could mention it.

Figures and tables:

no need to write "determined by SAS". This information everyone can read from the M & M.

Table 1: "with bars as standard errors"? Write open the abbreviations AP and AK.

Figure 3: No need to mention the methods, except perhaps in the beginning: "Kaplan-Meier survival curves and ..."

Figure 4: one bracket too much or too few. Number of n should be mentioned.

Figure 5: I would really much like to know how the three sites place along these axis. Identify them, please. And the spelling mistake in the legend (obtained).

Interactive comment on Biogeosciences Discuss., 12, 19999, 2015.