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Solid Earth Discussions

Interactive comment on "The effects of grazing on the spatial pattern of elm (*Ulmus pumila* L.) in the sparse woodland steppe of Horqin Sandy Land in Northeastern China" *by* M. Zhang et al.

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RC:The last sentence of Introduction:...Our findings significantly contributed to the understanding of the formation of spatial pattern of elm population in sparse woodland steppe...sounds smug or conceited. I recommend the authors to modify it. For example: We consider that our findings could contribute to the understanding of the formation of spatial pattern of elm population in sparse woodland steppe...

AC:We thank for your comments and revise the MS following your suggestion.

Page 3342 Line 11: Our findings could contribute to the understanding of the formation

of spatial pattern of elm population in sparse woodland steppe.

RC: Study area: I advise authors to include a figure with two maps of the study area, the first one more general and the other one more detailed. It will help the readers from other parts of the world.

AC: We appreciate for this suggestion and prepare the revised figure (below) instead of Figure 1 in the original version.

Figure 1. The location of study area and relative coordinates of elm trees in grazed plots (a) and fenced plots (b).

RC:Study area, climate: Where did climate data come from? Did they come from a weather station near the plots? Period of data collection, how many years have they been collected?

AC:We cited the data from the literature, i.e., Li et al.(2006) and Yan and Liu(2010)(Page3342 Line 22). These two papers are listed in the reference (Page 3350 Line 23-24 and Page 3351 Line 33-34). Li, X. H., Li, X. L., Jiang, D. M., and Liu, Z. M.: Germination strategies and patterns of annual species in the temperate semiarid region of China, Arid Land Res. Manag., 20, 195–207, 2006. Yan, S. G. and Liu, Z. M.: E_ects of dune stabilization on plant diversity of interdune wetlands in the northeastern Inner Mongolia, China, Land Degrad. Dev., 21, 51–60, 2010. We found a tiny mistake and revised in the latest version.

Page 3342 Line 21: The mean annual precipitation is 340mm,

RC:Study area, climate: Authors refer -14âĎČ as the mean daily temperature in January. Is it true? Maybe -14âĎČ is the mean minimum temperatures. Could authors clarify this doubt I have?

AC:-14âĎČ is the mean minimum temperatures. You are right. We very thank for your suggestion. In fact, we never notice this mistake before. We collected the daily temperature data in January 2014. The mean minimum temperatures is -16.4âĎČ and

the mean daily temperature is -9.4âĎČ. The -14âĎČ is more close to -16.4âĎČ, which is the mean minimum temperatures. Therefore, we realize that it is really a mistake and it is a really mistake.

Page 3342 Line 19: Mean minimum temperature.....

RC:Study area, plots description: There is only a plot per replicate (grazed vs not-grazed). It is a pity; the power of the study diminishes.

AC:We really agree with you. In the study area, grazing is mainly working way for many people. Thus, it is difficult to find plots without grazing. And our funding is not enough to pay to the herdsmen making them abandon grazing in other plots.

RC:Study area, plots description: Are the fenced and grazed plots completely comparable? Have both plots the same orientation, soil characteristics, soil depth, stoniness, microtopography, etc.?

AC:We thank for your comments. The fenced plot is almost the same with the grazed plot in the aspects of soil physical and chemical characteristics, and microtopography before it is fenced. However, the soil characteristics might changed under the grazing. The change in soil characteristics is the aim of our further study, but not included in this manuscript. Page 3343 Line 3: The slopes in the two regions were 3–5°in average. The fenced plot is almost the same with the grazed plot in the aspects of soil physical and chemical characteristics, and microtopography before it is fenced. The species included ...

RC:Study area, plots description: Has the fenced plot always been fenced? Has it never been grazed? Or, how long has it not been grazed?

AC:The fenced plot has been fenced since 1998. It has never been grazed since 1998.

Page 3343 Line 1: Two permanent plots, with one of 44.2 ha (650m-680 m) that was fenced in 1998....

RC:Data collection and analysis: Why authors thought that 10 cm DBH is enough to avoid the potential effect of inter-specific competition? Is this thought based solely on differences in size?

AC:We thank for your comments. We thought that superior competitive ability in plants generally requires relatively large plant body size. As elm tree is the only tree in the study region, when its body size is large enough, potential effect of inter-specific competition might not be considered. Without considering inter-specific competition, we could focus on the intra-specific competition. The DBH is a feasible indicator measuring the plant body size. And DBH in 10 cm is much larger than diameter of other species. We notice that competition ability might be not consistent with body size, which are reported recently. However, we missed this when the experiment designed. If possible, the inter-specific competition could be explored in our further study. Thanks again!

Page 3343 Line 10 As superior competitive ability requires relatively large body size in plant, we thought that 10 cm DBH is enough to....

RC:Data collection and analysis: What is the GPS accuracy?

AC:The GPS accuracy is 0.5 m in the Maximum.

Page 3343 Line 16: ...were recorded using GPS (Global Position System, the accuracy is 0.5 m in the Maximum).

RC:Results. Number of elm trees in grazed and fenced plots: Surfaces of grazed and fenced plots are very different (44.2ha and 10.5ha, respectively). As a consequence, I think that total number of elm trees is not a good indicator. I advise authors to use densities.

AC:We used the density instead of number of elm trees. Thanks!

Page 3344 Line 15: Density of elm trees in grazed and fenced plots Page 3344 Line 16: Within the grazed plot, the density of elm trees (DBH> 10 cm) was 8.95 individual/ha.

Page 3345 Line 1: ..., the density of elm trees (DBH> 10 cm) was 4.37 individual/ha.

RC:Discussion: At the end of the first paragraph, authors wrote: ...This demonstrated that the distance between random and aggregated patterns was larger in the fenced plot than that in the grazed plot... I advise authors to change demonstrated by indicated or suggested.

AC:We revised it follow your advice.

Page 3346 Line 8: This suggested that the distance between...

RC:I am afraid authors use uniform pattern and random pattern as synonyms, in both cases as opposed to aggregated pattern. In lines 16, 18, 23, 24 and 26 of page 3346, and in line 4 of page 3347, all of them in discussion, authors refer to uniform pattern. In many other cases along the article, authors refer to random pattern. I appreciate the authors clarify my doubt.

AC:Uniform pattern(regular pattern), random pattern, and aggregated pattern are three basic patterns of plants. Maybe Figure 2 could help us explain these three patterns.

Interactive comment on Solid Earth Discuss., 7, 3339, 2015.

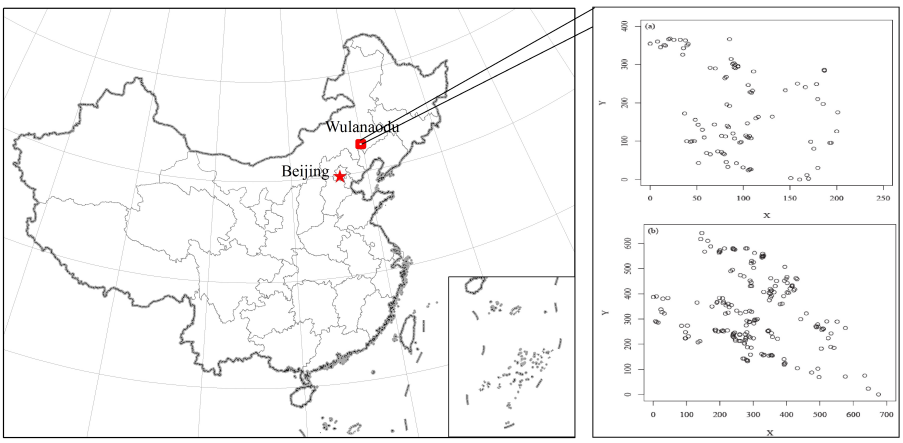

Fig. 1. FIG1

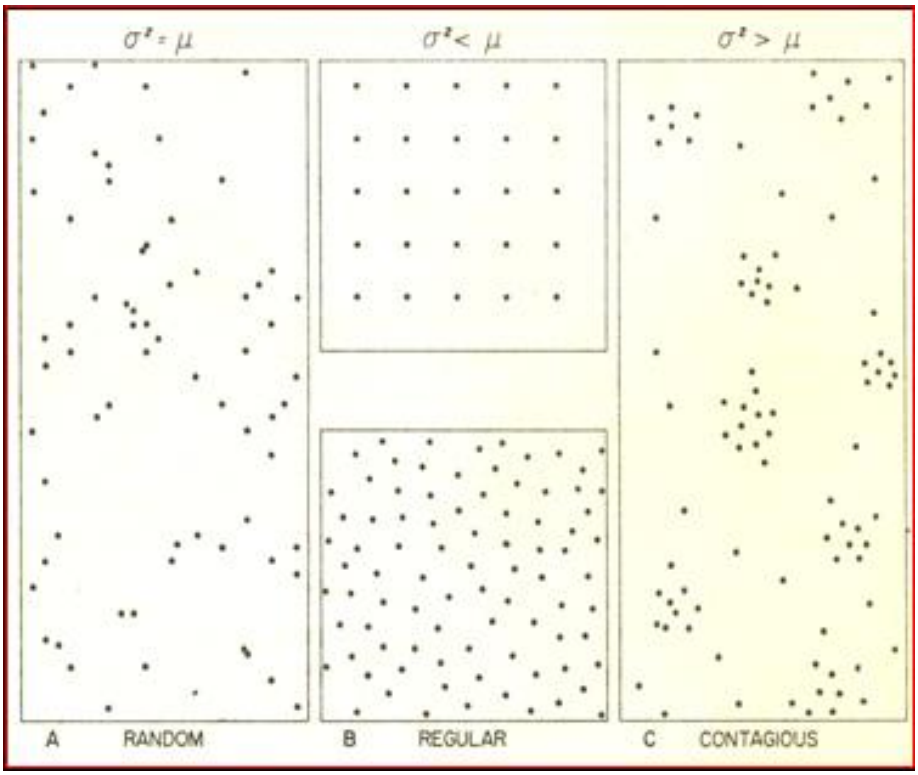
$\sigma^2 = \mu$
$\sigma^2 < \mu$
$\sigma^2 > \mu$
A RANDOM
B REGULAR
C CONTAGIOUS

Fig. 2. FIG2