
For review article: Species Abundance Models for Early Postfire Succession of Subalpine Shrub-Grassland

Response to Reviewer 2 Comments

1. Summary

Dear Reviewer 1, thank you very much for taking the time to review this manuscript. Please find the detailed responses below and the revisions and corrections highlighted (red) in the re-submitted files.

2. Questions for General Evaluation

Reviewer's Evaluation

Response and Revisions

Is the content succinctly described and contextualized with respect to previous and present theoretical background and empirical research (if applicable) on the topic?

Can be improved

We are grateful to your comments on this manuscript. Our corresponding response is in the point-by-point response later.

Are all the cited references relevant to the research?

Can be improved

We are grateful to your comments on this manuscript. Our corresponding response is in the point-by-point response later.

Are the research design, questions, hypotheses and methods clearly stated?

Can be improved

We are grateful to your comments on this manuscript. Our corresponding response is in the point-by-point response later.

Are the arguments and discussion of findings coherent, balanced and compelling?

Can be improved

We are grateful to your comments on this manuscript. Our corresponding response is in the point-by-point response later.

For empirical research, are the

Yes

results clearly presented?

Is the article adequately referenced?

Yes

Are the conclusions thoroughly supported by the results presented in the article or referenced in secondary literature?

Can be improved

We are grateful to your comments on this manuscript. Our corresponding response is in the point-by-point response later.

3. Point-by-point response to Comments and Suggestions for Authors

General comments:

The paper proposal studies the postfire floristic succession in a Subalpine shrub-grassland in the at Xue Mountain (Taiwan) using different species Abundance Models. The final objective is to obtain detailed insights into habitats during post-disturbance restoration processes during the first five years. The paper is based on a systematic sampling conducted in the field on the postfire area of the shrub-grassland. The starting reference is a fire incident from 18 December 2018. Data obtained are analyzed in terms of species diversity, distribution, and coverage during postfire succession. Different periods of postfire data were simulated using the five species abundance models. In summary, the results show that five years after the fire event, the status of shrub-grassland at Xue Mountain gradually approached stability. In general, species abundance models provided good interpretations for collected data and for the ecological processes and current statuses of the vegetation. However, fitting results for each species abundance model showed that the Zipf–Mandelbrot model and the log-normal model provided optimal results for most of the restoration process.

The paper contains a large amount of data, both raw, but also processed to offer analytical information well rendered by a rich illustration. The cited literature is also quite substantial, at least quantitatively. Thanks to the systematic monitoring and the models used, the vegetation recovery processes, in the case studied, are very well described, and explained. However, in its current form the paper still deserves some improvement. The reviewer is not an expert in the different models used and will not judge the relevance of their implementation here and trusts the authors. But given our knowledge of the impacts of fires in numerous ecological contexts and of vegetation resilience processes, we can raise a certain number of questions here.

In terms of his form, there are no major comments to make. The construction is logical, the data and results are well presented and the figures all useful. It would be useful to add a scale to the images in fig.2. The bibliography is formally well presented but needs to be completed (see below). As a non-native English speaker, the reviewer cannot judge the level of language.

Response general comments: Dear reviewer, thank you for your constructive comments on improving this manuscript. The response point-by-point, please see below. We have added a scale to the images in Fig. 2.

Comments 1: This paper offers a very interesting case study on the natural restoration capacity of vegetation after disturbance. But for a paper proposed to Fire, the role of fire should be put back at the center of the problem. Its publication must also have a more general interest than just the case study.

Response 1: Thank you for your comments. Although this study is located in a high-

elevation mountainous area and is close to mountaineering trails, and there are few studies on high-elevation grasslands in the current literature, the results we present are similar to those of many Species abundance distribution, SAD studies. In addition, because the number of plants cannot be calculated in grassland, this study calculated the grassland coverage area. The SAD results are also consistent with the description in the species diversity section of this study. Although this study can easily be considered a case study, our results and discussions can be used as an example of the role of fire in subalpine grasslands and the impact of fire on subalpine species abundance distribution models.

Comments 2: *Authors must therefore better explain the role of fire in this environmental and bioclimatic context. According to the climate diagram in Fig.1, even if the month of December is the least rainy, there is no dry month in the year. We therefore do not understand how fire can circulate in this type of vegetation, if the authors do not explain what the combustible biomass is. Also, how frequent are fires in this environment? Is this fire an exceptional accident or is there a regular return of fires? At what time frame? You also need to better characterize the nature of this incident, perhaps in the “Materials and Methods” section. We must wait until l. 254 to learn that the fire event was a “low-intensity surface fires”! Some of this information is given only at the beginning of the discussion: “Due to the occurrence of fire during the winter season [...] the harm caused to the majority of the plant compositions was minimal”. However, this information is useful from the start to understand the results (3.1, 3.2, fig.3, Table 1 & 2).*

Response 2: Thanks to your comments. We have revised our manuscript, recalculated the climate data between 2009~2019, and remarked on the climate diagram (Please see Lines 81-84; Figure 1). Lines 104-106 explain why fires continue to occur despite high winter humidity and provide local fuel sources and contributing factors. The frequency and timing of fire are listed in Table 1A of the Appendix. Moreover, we have revised the causes and types of fire formation description in the Materials and Methods.

Comments 3: *The authors here rely on a single fire event and discuss vegetation restoration after disturbance. Despite validation by several models, can we still rely on this study in other contexts? The discussion must therefore better compare the results to the international literature specific to postfire succession in Subalpine vegetation. This literature is insufficiently considered in the paper (refs 1,2,3 only in the introduction). This discussion is important to validate the statement in l.348: “Our results showed that the subalpine shrub-grasslands in Taiwan comprised fire-dependent vegetation” or other statements in the Conclusion. Finally, the conclusion must be strengthened by taking into account all these elements to further highlight the role of fire.*

Response 3: Thank you for your comments. According to forest fire records in Taiwan, fires occur in this study site every few years, and most of the fires are caused by human factors. We have added the study area's past fire history and frequency in the supplementary file. In addition, we have added the control group (unfired area) to support the shrub and grassland recovery trend after fire (Please see lines 123-124). We also reviewed the results with the control group to state our conclusions. Furthermore, we added more references to validate our statement (Please see References 1-6, 20, 22, 49).