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Interactive comment on “Burning management in the tallgrass prairie affects root decomposition, soil food web structure and carbon flow” by E. A. Shaw et al.

E. A. Shaw et al.

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Dear Referee #1,

Thank you for the time devoted to reviewing our manuscript and for your insightful comments. We also thank you for pointing out the broad interest of our study. Your clear suggestions are very helpful for improving the manuscript and we will be able to address these carefully in the revision. Following your suggestions, we will refine our manuscript to be more concise as we address your specific comments in detail (see our responses below). Together with the helpful suggestions of referee #2, your attentive comments will contribute to an improved manuscript, which we hope you will

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find suitable for publication in SOIL.

Thank you and kind regards.

E. Ashley Shaw (on behalf of the authors)

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Specific comments: “p. 926, line 14: “microbial community composition””

AUTHORS’ RESPONSE: We will change “compositional” to “composition”

p. 927, line 5 - 11: “stable isotopes” is not very precise, better would be something like “natural abundances of 15N and 13C”; also you should make clear when you are talking about labeling experiments in the next sentence

AUTHORS’ RESPONSE: We will change the sentence to clarify that trophic structure has been studied using 13C and 15N. We will change the following sentence (line 9) to specify labeling experiments.

p. 931, line 21: The authors select the PLFAs 20:4n6 and 20:5n3 to represent protozoa (no reference provided). However, these fatty acids also occur in nematodes (Chen et al. 2001, Chamberlain et al. 2005), this should be taken into account.

AUTHORS’ RESPONSE: Previous work has used the PLFAs 20:4n6 and 20:5n3 to represent protozoa (Gomez et al 2014; Ringelberg et al 1997); we do agree with referee #1 that these PLFAs occur in other eukaryotes, including nematodes. Due to this overlap and the minor role of these data in the manuscript, we will remove the protozoa (20:4n6 and 20:5n3) results from the revised manuscript. These data were a minor part of the results and discussion, and removing them will not affect our conclusions.

p. 933, lines 16, 17: for analysis of variance, time, soil and litter addition were treated as categorical variables. This is not correct since time is not an independent variable. Instead, the authors should use a repeated measures GLM to separate “within” and “between” effects.

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AUTHORS' RESPONSE: Our statistical methods were based on previous soil community analyses and were done in consultation with a statistician at Colorado State University. Our study was not a true repeated measures design, as we were not taking samples from the same plot or pot repeatedly over time, but instead destructively sampled individual pots of soil at each time point. We considered carefully the referee's suggestion and have even already performed the statistics as suggested by the referee. A repeated measures GLM does not change the overall statistical results, and the manuscript conclusions would not change if we were to use the repeated measures GLM instead. However, because the experimental design was not a repeated measures design, we will keep the statistics as they are.

p. 935, lines 23-25: regarding Fig. 5, to it looks like the sentence "Higher trophic levels: : :, this increased by the final harvest." is only true for IB and not for AB.

AUTHORS' RESPONSE: Thank you for pointing out this ambiguity. We will clarify the sentence by writing, "Higher trophic levels (omnivore and predator nematodes) began to have root litter C incorporated into their biomass by 21 (IB, Fig. 5a) and 35 (AB, Fig. 5b) days. This amount increased by the final harvest with IB omnivore and predator nematodes having greater root litter C incorporated than AB by the final harvest (Fig. 5).

p. 937, line 18: change " : : :impacts to organic matter decomposition: : :" to " : : :impacts on organic matter decomposition: : :"

AUTHORS' RESPONSE: We will change "to" to "on"

P. 937, lines 22-24: Reformulate this sentence to state your actual results and then help the reader by shortly stating your second hypothesis.

AUTHORS' RESPONSE: We will change the sentence structure to "Root litter mass loss was greater for the AB treatment, confirming our second hypothesis that decomposition would be greater for the AB treatment."

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p. 937, 938: the paragraph on “Effects of burning management on root decomposition and root-C dynamics” should be written more concisely; it should become clearer which conclusions can be drawn from the present study, e.g. p. 938, lines 3-7: these two sentences “Other studies have compared: : :” and “These studies have shown: : :” should be combined;

AUTHORS’ RESPONSE: We will combine the two sentences as follows, “Other studies have compared belowground decomposition in areas of contrasting burning treatments and have found that wood decomposed significantly faster . . .”

p. 938, line 7 “such differences” do you mean the differences you observed, or the differences observed by Reed et al. and O’Lear et al., or both? Make more clear when you are discussing your own results and put the emphasis on that. Similarly, p. 938, lines 10-14, how does this last sentence relate to your study, do you propose that N-scavenging may play a role in your AB soils?

AUTHORS’ RESPONSE: On p. 938, line 7 we will replace, “Such differences in decomposition between burning treatments” with, “Faster decomposition in annually burned prairie soil.” Also, on p. 938, lines 10-14, we are proposing that N-scavenging could play a role and will improve the transition to this sentence by changing it to read “Relative to unburned prairie soil, the soil conditions of frequently burned areas are often N-limited, causing microbes to scavenge for N before beginning decomposition”

p. 939, line 20-22: may be a matter of taste, but I would rephrase this to “per gram of soil, nematodes can hold as much as half of root litter derived-C as microbes do”

AUTHORS’ RESPONSE: We will rewrite this sentence as suggested

Table 1: I would suggest to use the same abbreviations as in the text for your treatments (AB and IB), and not Freq. burn and Infreq. Burn

AUTHORS’ RESPONSE: We will change the text to AB and IB for consistency

Fig. 3, caption: it is not clear what you mean by “: : :significantly higher abundance

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of a particular trophic group between burn treatments: : :”, I would suggest to write “: : :significantly higher abundance of a particular trophic group in the respective burn treatment: : :”

AUTHORS' RESPONSE: Thank you for pointing out this ambiguity. We will rewrite this caption as suggested.

Fig. 4, caption: ”: : :, and root litter derived carbon incorporated in nematodes (c) are reported.”

AUTHORS' RESPONSE: We will change the caption as suggested by moving the “(c)” to follow the word “nematodes”

Fig. 5: please provide reference to the abbreviations in the legend, as in figs. 1-3.

AUTHORS' RESPONSE: Thank you, we will add the definitions of the abbreviations

Technical comments: p. 939, line 20: replace “Setala” by “Setälä” references: check for mutated vowels such as ä, ö, ü; e.g. it's Körner, C. and not Korner, C. Fig. 4, legend: use “AB” instead of “FB”

AUTHORS' RESPONSE: Thank you, we will make these corrections

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