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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.

Anonymous Referee #1

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The present study has been conducted within the Konza prairie long-term ecological research program and focuses on the impacts of burning management on carbon fluxes from decomposing roots into parts of the soil food web, i.e microorganisms and nematodes.

The general topic is of broad interest since burning is a common management practice in tallgrass prairies and its effects on belowground carbon dynamics are not yet well understood.

The study has been well designed and hypotheses are reasonable and formulated clearly. The main message/result of the study is that soil microbial- and nematode

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communities differ between annually and infrequently burned soils, with these differences modifying root decomposition and carbon fluxes. The authors suggest that soil communities of annually burned soils are better adapted to decompose root litter than those of infrequently burned soils, since root litter plays a larger role in the former soils.

Generally, this study provides new and interesting insights into root carbon dynamics. Specifically, carbon fluxes from roots into microorganisms and nematodes, and how these differ between annually burned and infrequently burned sites is interesting and deserves publication. However, the manuscript has to be improved to be more concise. Also, there are some statistical issues that need to be corrected, see comments below.

Specific comments:

p. 926, line 14: “microbial community 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

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.

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.

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.

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

SOIL

2, C642–C645, 2015

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

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; 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?

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"

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

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

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

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

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

SOIL
2, C642–C645, 2015

Korner, C.

Fig. 4, legend: use “AB” instead of “FB”

Interactive comment on SOIL Discuss., 2, 923, 2015.

SOIL

2, C642–C645, 2015

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