

## ***Interactive comment on “Switchgrass ecotypes alter microbial contribution to deep soil C” by Damaris Roosendaal et al.***

### **Anonymous Referee #2**

Received and published: 22 February 2016

This is a very interesting, novel and well-written paper. The significance of the study is fairly well articulated, with robust methods used to evaluate Switchgrass ecotype impacts on microbial communities. There are a few specific suggestions provided below that will help improved the manuscript. More could be made earlier on in the Abstract about the relevance of the research so that readers are drawn in. In places, particularly in the Introduction, the flow of text could be improved.

In Table 1 the carbon data should be presented on a volumetric basis. You should also determine the total carbon storage over the soil profile by accounting for bulk density. Express this on an area basis. If you have similar C contents over the profile after 3 years, yet vastly different root biomass, the result is highly significant to understanding how microbial decomposition versus root deposition of carbon affects carbon dynamics in soils.

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Abstract Overall very well written and easy to follow.

Around line 5 the practical relevance of the altered microbial community would be useful to mention to broaden readership.

Line 11 - it is not known if biomass is per plant or per area. For this study I would argue that per soil area is of greater interest as plant density could vary. You probably state this later (I've not read the paper yet) but this should be clear in the Abstract.

Line 15 - Summer soils etc. - this is confusing to the reader as it implies a different soil rather than a soil planted with a different ecotype.

Introduction

This described the background to the research very well. Overall the flow is very good, but please review to see if you can make it a bit clearer. One suggestion is provided below. Hypotheses are clear.

page 4 - lines 2-3: You need to link these paragraphs more clearly. A bit of a jump at present.

Materials and Methods. Very well described. The experiment could be repeated with the information provided.

page 4, line 28 - include the planting density. page 8, line 1 - the fungi information is a Result and should be moved.

Results Again, well written and it describes the results well.

It would be easier to read if general categories of statistical significance were included:  $P < 0.001$ ,  $P < 0.01$ ,  $P < 0.05$ , n.s.), e.g. page 9, line 20 -  $P < 0.001$  will suffice.

Discussion page 12, line 28 - change IL to 'Illinois in the US Midwest', so international readers can follow.

page 13, line 8 - there are plenty of studies on root traits versus soil properties so the

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finding for lettuce was a bit odd to include when other studies exist for grasses grown in more similar conditions. From your data it appears that you can infer below-ground biomass from above-ground, so is yield not a simple measure to determine optimal ecotypes?

page 13, line 28 - change 'higher' to 'greater' to avoid confusing with depth. Check this throughout the paper as it appears in other places.

page 15, line 17 - you use 'cultivars' here and 'ecotypes' elsewhere. You are best to stick to one term, likely ecotype given the considerable phenotypic differences between the plant treatments.

page 15, line 29 and references - 'Rillig'

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