

## ***Interactive comment on* “Combined effects of altered N:P stoichiometry and trees on Mediterranean savanna root dynamics” by Richard Nair et al.**

**Richard Nair et al.**

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We thank the anonymous reviewer for their comments on our manuscript. We are pleased the reviewer recognized the novelty of the study setting and the amount of data collected. We are definitely willing to improve the clarity by adding a map of the field site, and try to streamline some expressions and adjust the short number of minor corrections requested in the first two paragraphs of the manuscript.

However, it is hard to understand the reviewer’s statement regarding the clarity of the manuscript, because he/she hasn’t described any major failures in the text in the short review. Particularly, we would be grateful if the reviewer could accompany the recommen-

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dition to delete some of the data recommend any particular part of the dataset which they believe superfluous to the overall message because at the current stage is hard to understand what are the concerns of the reviewer which lead to their suggestion for an overall restructuring of the manuscript.

We will improve the description in the experimental design, which can all be found in the same paragraph at the beginning of the methods section (page 4 line 20 – page 5 line 1). We are also happy to provide an additional figure or table in the revised version to clarify the set up, which consists of 3 large scale (~ 20 Ha) nutrient treatments ( page 4 line 20-26), an installation of root observatories within each nutrient treatment (12 observatories per treatment, line 30), with observatories arranged in sets of 4 around individual trees (page 4, line 31), so each 'tree location contains two 'tree covered' and two 'open pasture' locations (page 5, line 1) per tree. This results in 6 replicates for nutrient treatment x location per footprint. To make sure this section is fully understandable we will add a clarification into the text on page 4, line 23, and define 'treatment' is as used to refer to nutrient treatments and tower footprints while 'location' refers to spatially distinct tree covered or pasture locations.

We would also like to provide a full response to the reviewer's concern that "in nutrient treatments (N and NP addition), why there was no P addition and how can you tell the relative importance or effects of N or P addition on your evaluated parameters? It needs more information"

We discuss the expected effects of nutrient treatments in both the introduction and discussion of the manuscript (e.g. page 4, lines 1-5, page 10, lines 22 to 25), which follows ecological theory regarding stoichiometric imbalances induced by N available [1,2] rather than testing the effects of P addition. We make no claims at any point in the manuscript to be testing the effect of P availability alone on the parameters evaluated in the experiment but we will be happy to clarify some aspects (including some of the information which follows) if unclear.

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The overall (site level  $\sim 24$  Ha) experiment was designed to study the impact of the stoichiometric N/P imbalance (high N/P in vegetation pools ratio (+N) vs control (control) level vs relieved limitation (+NP)) at ecosystem scale on ecosystem fluxes, functioning and to plant and soil processes. For this purpose a P treatment was not necessary. However in previous publications we have shown a small scale manipulation experiment using a full factorial design to evaluate the relative importance of P but with less frequent measurements and no minirhizotron data. In gross primary productivity, ecosystem respiration, and vegetation structure and vegetation structure (LAI, Chlorophyll content derived from proximal sensing information [3,4], and the biological turnover of P and soil Carbon, total Nitrogen and P-Olsen content as consequence of the nutrient status induced by the fertilization [5]). All these analyses show that the addition of P alone does not significantly impact vegetation processes, and structure, and while this did increase P in leaf tissues, this significant change observed is an increase in the P turnover rate and an increase of P in the leaf tissues, this did not significantly affect productivity, vegetation structure and carbon-water fluxes measured. Moreover, the vegetation pools at the site prior to fertilization indicate that the site is more N limited than P limited given the relatively low N/P ratio in plant tissues (N/P = 9.018 (sd 0.49)) measured in March 2014 [4]), and this explains the small response of ecosystem function, structure and function to P fertilization.

Regarding the specific points raised by the reviewer, which all concern the first two paragraphs of the manuscript, we agree that:

- i) C as an abbreviation for carbon should be presented at first mention (page 1, line 2) rather than on page 1, line 20
- ii) there could be some minor confusion with the technically incorrect use of 'both' to refer to the following list of global change factors (page 1, line 26), as this by strict definition refers to a list of two items only. This can be replaced with a small grammatical change in a further revision.

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We however disagree that there is any confusion in using site to refer to a location (page 1, line 23) - when used as a noun, site always refers to a location and has essentially the same meaning as 'place'.

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