

Interactive comment on “The interaction between nitrogen and phosphorous is a strong predictor of intra-plant variation in nitrogen isotope composition in a desert species” by J. Zhang et al.

Anonymous Referee #1

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Comments to the authors

This paper aims to investigate the mechanisms controlling intra-plant variations in $\delta^{15}\text{N}$ of a desert species grown in natural conditions. The study focused on the intra-plant variations in $\delta^{15}\text{N}$ and N/P ratio of organs and discussed the plant nitrogen volatilization as a possible mechanism making intra-plant variations in $\delta^{15}\text{N}$. The experimental design and data presented in this manuscript are very interesting and worth for reporting. Authors were successful to show interesting patterns and reasonable discussion as a whole. However the data are not entirely satisfactory to be evidence for newly finding possible mechanisms. For example, the authors did not show N source of studied

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species such $\delta^{15}\text{N}$ value of soil N, precipitation, ground water etc. Furthermore vertical distribution pattern of available soil P was not also shown. So data of this study seems too narrow to conclude the “new” mechanism. Furthermore the manuscript includes many problems and need considerable revisions as follows. The manuscript needs considerable revision before publishing.

Major points:

1. Need more data for $\delta^{15}\text{N}$ of N source such as soil, precipitation and ground water etc. The $\delta^{15}\text{N}$ of plant organs can vary with N source such as precipitation vs soil water, $\text{NO}_3\text{-N}$ vs $\text{NH}_4\text{-N}$, soil depth, and dependence of mycorrhiza interaction, N fixation etc. This study did not show these data and did not discuss about another possibilities of the mechanisms making intra-plant variations in $\delta^{15}\text{N}$.
2. Need more discussion for another possibilities such as N fixation, re-translocation and metabolism. For N fixation, Li et al 2015 recently reported the relationship between *Nitraria* plants and endophytic N-fixing microbes in related Salin-Alkaline stress. For re-translocation, Wang et al. (2014) reported root and leaf stoichiometry of same species, *N. tangutorum*, suggesting the importance of relative availability of P and N along aridity gradient and diffusion process within the plant organs. Furthermore *Nitraria* is halophyte, so N based osmotic adjustment substance such as betaine seems affect N metabolism within plant organs.

REF: Li et al (2015) doi:10.2991/cmfe-15.2015.15 Wang et al. (2014) Contemporary Problems of Ecology, 2014, Vol. 7, No. 3, pp. 308–314.

Minor points:

P18774 L13: How about discuss more about relationship between the results of carbon isotope ratio and this study, because same samples were used in this study.

P18778L2: “80 mesh” need more information.

P18778L9-11: What method was used for ashing samples?

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