

Interactive comment on “Higher response of terrestrial plant growth to ammonium than nitrate addition” by Liming Yan et al.

Anonymous Referee #1

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This manuscript addresses an important and interesting question whether the effect of N addition on plant growth is different for different chemical forms of N. The authors conducted a meta-analysis to compare the effect of NH₄ and NO₃ addition on plant growth. The authors found that the ratio of the effect of NH₄ to NO₃ addition depends on plant species, while the effect on below-ground and above-ground growth is different with respect to NH₄ to NO₃. Further, the authors had assessed the trends in the ratio of NH₄ to NO₃ in global total wet N deposition. As a conclusion, the authors suggest that future assessments and predictions on the vegetation response to atmospheric N enrichment could benefit from a better understanding of plant strategies for acquiring different forms of N. Overall, the results are useful. However, some key points are not supported in the paper, which should be considered before the paper can be accepted

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for publication. As a main caveat, the influence of climatology is not considered in the present analysis. It seems that the authors only compared the effect of NH₄ and NO₃ addition on plant growth across species. However, there are many factors that can affect the fertilizing effect of N, such as temperature, soil type, soil water availability, age of plants, and timescale of fertilizing experiments. Since not all the papers collected by the authors cover these information, the authors should at least use data from the literature providing these information. Please see some specific comments below. Comments: Line 26: “plants respond differently to NH₄⁺-N and NO₃⁻-N addition have never been quantitatively”. This statement is questionable. It is clear that there are studies that compared the responses of plant preference to NH₄⁺-N and NO₃⁻-N addition (see the sentences on line 81-83). It could be rephrased. Line 120-125: In their Supporting Information, I find that the authors only provide the reference list used in their meta-analysis without providing the raw data. It is useless unless the authors provide the raw data as well as the related information together. Since the main purpose of this paper is to introduce such a database as the core of the meta-analysis, the whole database must be clearly provided to ensure the repeatability of the work. Line 127-134: Again, in their Supporting Information, I find that the authors only provide the reference list used in their meta-analysis without providing the raw data. Since the purpose of this paper is to introduce a database as the core of the meta-analysis, the whole database must be clearly provided to ensure the repeatability of the work. Line 205-207: “In the manipulative experiments, the ratio of NH₄⁺-N/ NO₃⁻-N in the soil was differently influenced by N deposition (Fig. 3)”. I cannot find the difference in the ratio of NH₄⁺-N/ NO₃⁻-N changed by N deposition in Fig 3. Please explain it more clearly. Table 1: Total deposition does not support the conclusion that “These results imply that the global accelerating N deposition could stimulate plant growth more in regions with increasing (e.g., North America) than decreasing (e.g., eastern China) NH₄⁺-N/NO₃⁻-N ratio.”, because only N deposition over terrestrial ecosystems affects plant growth. The authors should provide the numbers of NH₄⁺-N/NO₃⁻-N deposition over terrestrial ecosystems. Minor comments: Line 66: “affect” -> “affected”. Line 278: “Given to”

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-> "Given"

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