

Title: **The** Interaction of CO₂ concentrations and water stress in semi-arid **areas plants** causes diverging response in instantaneous water use efficiency and carbon isotope composition

Abstract: (changes are in red)

L10-14: It is commonly **reported** that ¹³C fractionation **occurs as CO₂-gas diffuses from the atmosphere to the sub-stomatal cavity**. **Few researchers have investigated** ¹³C fractionation at the site of carboxylation to cytoplasm before sugars **are exported outward from the leaf**. **This process typically progresses in response to variations in environmental conditions (i.e., CO₂ concentrations and water stress), including in their interaction.**

L14-17: Therefore, saplings of **two typical plant species found growing in semi-arid areas** of Northern China of similar **growing** status—*Platycladus orientalis* and *Quercus variabilis*—were selected and cultivated in growth chambers with orthogonal treatments (four CO₂ concentrations [CO₂] × five soil volumetric water contents (SWC)).

L23-24: Differences in instantaneous water use efficiency (iWUE) according to distinct environmental changes differed between **the two** species.

L24-28: The WUE_g **in** *P. orientalis* was significantly greater than that **in** *Q. variabilis*, while **an opposite trend was observed when comparing WUE_g between the two species**. Total ¹³C fractionation **at** the site of carboxylation to cytoplasm before **sugar export** (total ¹³C fractionation) was clearly species-specific, as demonstrated in the interaction of [CO₂] and SWC.

L28-30: Rising [CO₂] coupled with moistened soil generated increasing disparities **in** δ¹³C between **the—water-soluble** compounds (δ¹³C_{WSC}) and **estimates based on gas-exchange observations** (δ¹³C_{obs}) in *P. orientalis*, **ranging between** 0.0328‰–0.0472‰.

L34-37: Total ¹³C **fractionation was** linearly dependent on g_s, indicating post-carboxylation fractionation **could be** attributed to environmental variation. Thus, clear description of magnitude and environmental dependence of apparent post-carboxylation fractionation is worth our attention **when addressing** photosynthetic fractionation.

Introduction:

Change

L42: ‘together with’ to ‘**culminating in**’

L43: ‘low water availability’ to ‘**dryness**’

L50 ‘environmental changes and their influences’ to ‘**environmental change and their influence**’

L51: ‘While the depletion’ to ‘**While depletion**’

L52: ‘itself might also affect the δ¹³C of plant organs’ to ‘**itself may affect δ¹³C of plant organs**’

L53: ‘climatic change’ to ‘**changes in climate**’

L55: ‘Discrimination against’ to ‘**Discrimination of**’

L57-58: ‘**even the mesophyll conductance derived from the difference of CO₂ concentrations between intercellular site and chloroplast (Farquhar et al., 1982; Cano et al., 2014)**’ the addition of this segment of text does not fit well with the preceding text, please rewrite

L67: change ‘the carbon discriminations that follow’ to ‘**the carbon discrimination that follows**’

L77: misspelt Farquhar’s name, please fix

L82; 'for the differences from' to '**for the differences in the**'

L87: change 'magnitude of these carbon fractionations are related to environmental variation have not yet been investigated.' to '**magnitude of carbon fractionation is related to environmental variation that has yet to be fully investigated.**'

L94-95: 'However, there is a dispute whether the fractionation stemmed...' to '**However, there is disagreement whether fractionation stemming...**'

L97-99: awkward, please rewrite

L103: at the first mention of the growth chamber (use the full citation that you provide on L120-121)

L122-123: 'daytime temperature in chambers was set to $25 \pm 0.5^\circ\text{C}$ from 07:00 to 17:00, and the night-time temperature was $18 \pm 0.5^\circ\text{C}$ from 17:00 to 07:00' to '**daytime and nighttime temperatures in the chambers was set to $25 \pm 0.5^\circ\text{C}$ from 07:00 to 17:00 and $18 \pm 0.5^\circ\text{C}$ from 17:00 to 07:00**'

Omit L 131 & 132.

L141-144: can this be simplified?

L148-154: can this also be simplified? Can you put this detail and the detail above in a table?

L165-166: this needs revising

L179: second R_{sample} needs to be change to R_{standard}

Throughout the manuscript: usage of CO₂ concentration, sometimes you use [CO₂] and other times you spell it out; try to be consistent; since you introduced [CO₂] why not continue to use it? The labels on some of the Figures are simply too small; please fix

What I provide above are some problems that I was able to identify, without having to address every line of the manuscript. There are many more problems with the writing and I would suggest that you get professional editing help in rewriting the manuscript. A lot of the problems I identify are associated with grammar and ways of expression. The three referees that I had review your manuscript all agree that the material is publishable based on scientific merit. However, I feel the manuscript needs considerable work to make it stand out. I will give you opportunity to fix the problems. I would like to see the revised manuscript again before making a final decision.