1. The author should clarify how long the samples were collected after water and nitrogen addition, as this will affect the results of the measured photosynthetic rate, stomatal conductance and water use-efficiency. More information on this should be added.

Answer:
Thank you for your suggestion! I have added the information (please see 192-194, lines 203, lines 223-224 in the marked-up manuscript version). In order to avoid the instantaneous effect of water and nitrogen addition on plant gas exchange, gas exchange measurement was performed before water and nitrogen addition. The measurement of gas exchange was conducted in 27-29, June, while the addition of water and nitrogen were applied in equal amounts, twelve times, once a week in April, July and September (please see lines 192-194, lines 203 in the marked-up manuscript version). The sample collection was carried out on July 20, during the process of adding water and nitrogen in July. This is because the main measurement index of the collected samples is carbon isotope, which is less instantaneously affected by the water and nitrogen addition. We have supplemented the time of sample collection in the revised version, please see lines 223-224 in the marked-up manuscript version.

2. Since the authors chosen H. ammodendron as their study object, the species, habits, characteristics of H. ammodendron should be elaborately described in the manuscript. I suggest the authors add this part of content.

Answer:
Your suggestion is correct. Thanks! We have added the information. *H. ammodendron* is a species of Chenopodiaceae, which is a xerophytic and halophytic woody plant (Cui et al., 2017). The leaves of *H. ammodendron* have been completely degraded due to the extreme drought, and the assimilation branches, which are the glossy green branches (Fig. S1), perform the same functions as the leaves. Due to its drought tolerance, H. ammodendron is widely distributed in desert areas. Please see lines 171-177 in the marked-up manuscript version.

3. What is the type of nitrogen used as the fertilizer to simulate the N adding experiment? And whether this type of nitrogen could be effectively used by H. ammodendron.

Answer:
Thank you very much! The type of nitrogen used in the N addition is NH_4NO_3, Cui et al. (2017) has confirmed that this type of nitrogen could be effectively used by *H. ammodendron*. We have supplemented the type of nitrogen in the revised version, please see lines 191-192 in the marked-up manuscript version.

4. How did you measure the CO2 concentration in the assimilation branches? The assimilation branch is what the part of H. ammodendron. Could the authors show a

picture of the assimilation branches of H. ammodendron in the supplemental materials?

Answer:
Sorry, our unclear expression may mislead you. In fact, we did not measure the CO_2 concentration in the assimilation branches. However, we obtained ambient CO_2 concentration(c_a) and intercellular CO_2 concentration (c_i) using LI-6400 portable photosynthesis system. Assimilation branches refer to the green branches of *H. ammodendron*. Due to the deterioration of the leaves, *H. ammodendron* has no leaves, only branches, and uses green branches as assimilation organs (please see lines 174-176 in the marked-up manuscript version). A picture of assimilation branches has been supplemented in the revised version, please see Fig. S1.

5. Have the authors only measured the gas exchange in June? The gas exchange of plants has a large variation in the day and night as well as the different months. Could the data of June represent all the conditions?

Answer:
Your concern is correct. Due to the difficulty of the measurement, we did only measure the gas exchange at the end of June. We also recognize that there are day-to-night differences and monthly differences in the gas exchange of plants. However, from the end of June to July is the most important growth period for *H. ammodendron*. So we believe that it may be the most appropriate to take measurements during this period, and the results of the measurements are therefore more representative. Previous studies have also generally conducted this measurement during growing season (Nyongesah and Wang, 2013; Cui, 2018; Gong et al., 2019). The reason why we chose this time period to measure gas exchange has been added in the revised version, please see lines 202-207 in the marked-up manuscript version.

6. Line 195-203: I do not clearly understand what index you measure at here?

Answer:
Sorry for our unclear expression. The indexes include photosynthetic rate (A), stomatal conductance (g_s), transpiration rate (E), the ambient CO_2 concentration (c_a) and the intercellular CO_2 concentration (c_i). We have added this information in the revised version, please see lines 209-213 in the marked-up manuscript version.

7. Section 2.5, When did you sample the assimilation branches? How long have the assimilation branches been cut? And how long is the growth time of the length of the sample collected?

Answer:
The sample collection was carried out on July 20, please see lines 223-224 in the marked-up manuscript version. The length of the sample is 15-20 cm, please see line

228 in the marked-up manuscript version. After the samples were collected, they were immediately divided into two parts randomly and taken back to the laboratory at Fukang Station. In the laboratory, the first part was used to determine the chlorophyll content immediately. The second part was immediately inactivated in a 105 °C oven, and then brought back to Beijing in a ziplock bag. The time interval between sample collection and inactivation is very short. After inactivation, the carbon exchange of the assimilating branches stop, so the isotope composition of the samples will not change anymore. These information have been added in the revised version, please see lines 231-241 in the marked-up manuscript version. We believed that these assimilation branches were synthesized in the year of sampling.

8. Could you add some introduction about the mechanism of how the ratios of ci/ca control the δ13C variations of plants?

Answer:
Thanks for your suggestion! The pattern of carbon isotopic discrimination (Δ) in C_4 plant has been introduced in the paper, please see equation (2). According to this equation and its transformation (equation (3)), if the coefficient $[b_4 + \varphi (b - s) – a]$ is greater than 0, $\delta^{13}C$ decrease with increasing c_i/c_a, if this coefficient is lower than 0, $\delta^{13}C$ increase with increasing c_i/c_a. This mechanism has been added in the revised version, please see lines 134-136 in the marked-up manuscript version.

9. The δ13Cair has large diurnal and seasonal variations. In section 2.6, I suggest the authors use the range of δ13Cair to replace the specific value.

Answer:
Thanks for your suggestion! We have added the range of $\delta^{13}C_{air}$ in the calculation in the revised version, please see lines 273-279 in the marked-up manuscript version.

10. In the Materials and methods, the authors did not clearly introduce how they measured the stomatal conductance (gs) and photosynthetic rate (A).

Answer:
Sorry. The measurements of A and gs were introduced in Section 2.4. Please see lines 213-221 in the marked-up manuscript version.

11. Line 306-308 and Line 311-313: the logic of these two sentences is a little chaotic.

Answer:
Sorry. We have revised these two sentences, please see lines 353-354 in the marked-up manuscript version.

12. Line 327-330: could the authors explain that why the traditional theory is useless at here?

Answer:
Thanks for the suggestion! The observed results may be caused by the extremely high light intensity at the study site. Due to the high light intensity, photosynthetic rate may not be correlated with chlorophyll contents. We have added this discussion in the revised version, please see lines 379-382 in the marked-up manuscript version.

13. Line 400-401, I did not see the correlation plot between Δ and ci/ca ratio.

Answer:
Sorry for our unclear expression. According to equation (2), Δ is equal to $\delta^{13}C_{air}$ minus $\delta^{13}C_{plant}$. Thus, no matter how $\delta^{13}C_{air}$ changes, Δ is negatively related to $\delta^{13}C_{plant}$. We found that $\delta^{13}C_{plant}$ was not related to c_i/c_a, suggesting that Δ has no correlation with c_i/c_a. We have changed our expression in the revised version, please see lines 417-419, 448-450 in the marked-up manuscript version.

14. Line 416-417: "Although this result was just opposite to a positive relationship between δ13C and WUE for C3 plants". Adding references for this sentence.

Answer:
Thanks! The references have been added in the revised version, please see line 467 in the marked-up manuscript version.