Analysis of photosynthetic characteristics of *Heteropogon contortus* in Arid-hot Valley Areas of Jinsha River

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Introduction *Heteropogon contortus* , as a dominant species in Arid-hot Valley Areas of Jinsha River , plays an important role for both maintaining ecological environment of grassland and realizing the ecological function . The aim of studying the photosynthetic characteristics in *Heteropogon contortus*' leaves under different circumstances is to figure out the difference of photosynthetic mechanism of *Heteropogon contortus* during various periods , and provide theoretic reference and technological reserve for ecological system restoration of Arid-hot Valley Areas of Jinsha River (Liu Yuhua et al . , 2006) .

Materials and methods The trial field lies in the breeding sheep stud on Renhe Town , Yongsheng County in northwestward of Yunnan Province , which is a kind of the typical Arid-hot Valley Areas . The altitude is 1500m , and the annual average temperature is 18-22℃ . The extremes of high and low temperature are respectively 38 .2℃ and 1 .5℃ . The annual precipitation is about 900mm . The exchange of dry and rainy season is obvious in Arid-hot Valley Areas . The vegetation are mainly *Heteropogon contortus and Fimbristylis dichotoma*(linn .) Vahl ,Enum , mixed with *Salix myrtillacea* Anderss . *Heteropogon contortus* was used in this study , whose photosynthesis was tested by CI-310 photosynthesis system in an open system .Net photosynthetic rate (Pn) , transpiration rate (Tr) , stomatal conductance (Gs) , intercellular CO_2 concentration (Ci) , leaf temperature (Tl) , WUE(Water use efficiency) and LUE(Light use efficiency) were tested in different methods (Tao Hanzhi et al) .The medium size , normal and fully expanded leaves were selected for the experiments . The leaves were sampled with triplicate , and the measurements were made 3-5 times . Data were analyzed by using EXCEL and SAS 6 .12 tools .

Results In this study , the diurnal changes of Pn , Tr and Gs exhibited two-peaked curves with an obvious midday-depress of photosynthesis . The changes of Pn and Gs were synchronous (Figure 1) . The determinations of those in rainy season were higher than those in dry one , however , the difference were not significant ($p > 0.05$) . The diurnal changes of Ci were similar in two seasons (Figure 1) . Figure 2 showed that the diurnal changes of WUE and LUE were expressed as two-peaked and "U" curves , respectively .

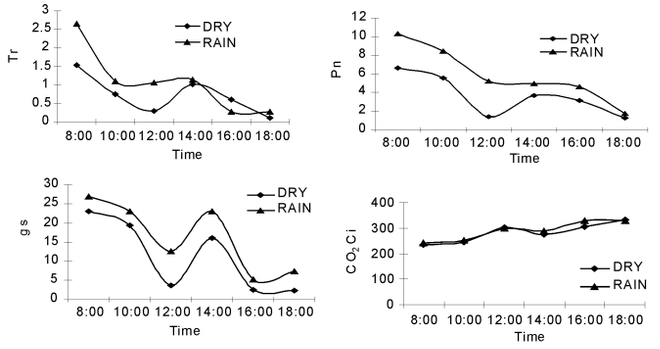

Figure 1 *Diurnal changes of Pn , Tr , Gs , Ci of* Heteropogon contortus .

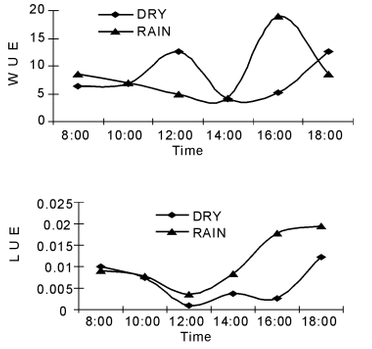

Figure 2 *Diurnal changes of WUE and LUE of* Heteropogon contortus .

Conclusions In specific circumstances of the Arid-hot Valley Areas , *Heteropogon contortus* can avoid water losing and alleviate the damage to photosynthetic organs from high light intensity and drought stress by midday-depress of photosynthesis , maintaining the lower Tr and enhancing WUE . Moreover , the higher values of LUE in the rainy season indicated the rainy season was the important period for *Heteropogon contortus*'s growth and yield's accumulation .

References

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