



University of Kentucky
UKnowledge

International Grassland Congress Proceedings

21st International Grassland Congress / 8th
International Rangeland Congress

The Photosynthetic Characteristics of *Hemarthria compressa* in Different Seasons

Huijun Huang
Sichuan Agricultural University, China

Chunhua Yang
Sichuan Agricultural University, China

Lingzhi Chen
Sichuan Agricultural University, China

Xiantao Fu
Sichuan Agricultural University, China

Zhisong Tang
Sichuan Agricultural University, China

Follow this and additional works at: <https://uknowledge.uky.edu/igc>

 Part of the [Plant Sciences Commons](#), and the [Soil Science Commons](#)

This document is available at <https://uknowledge.uky.edu/igc/21/1-5/4>

The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

This Event is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in International Grassland Congress Proceedings by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.

The photosynthetic characteristics of *Hemarthria compressa* in different seasons

Huijun Huang,* Chunhua Yang, Lingzhi Chen, Xiantao Fu, Zhisong Tang
Department of Grassland Science, Animal Science and Technological College, Sichuan Agricultural University, Ya'an, 621000 Sichuan Province, PRC. * Corresponding author, E-mail: ychh@sicau.edu.cn

Key words: *Hemarthria compressa*, Photosynthetic characteristic, Photosynthetically active radiation, Seasonal variation

Introduction *Hemarthria compressa* is very popular in southwest China for hay production and also a potential turfgrass germplasm for low maintenance turf (Yang, 2006). The photosynthetic variation in different seasons was unknown. The objectives of research were to discover the relationship between the photosynthetic characteristics and environmental factors in four seasons, and to find the photosynthetic productive potential of *Hemarthria compressa*.

Materials and methods The hay producing variety Guangyi' was planted in the Teaching and Research Center in Sichuan Agricultural University (38°08' N, 103°14' E) for four years. We took photosynthetic measurements from 2006-2007. Measurements of leaf gas-exchange on fully expanded leaves at the top of the canopy were made in situ every two hours through the diurnal period (from dawn until after dusk), using an open gas-exchange system incorporating a CO₂/H₂O vapor IR gas analyzer (Li-6400, LICOR, Lincoln, NE, USA). Net photosynthetic rate (Pn, $\mu\text{molCO}_2 \cdot \text{m}^{-2} \cdot \text{s}^{-1}$), intercellular CO₂ concentration (Ci, $\mu\text{mol} \cdot \text{mol}^{-1}$), transpiration (Tr, $\text{mmolH}_2\text{O} \cdot \text{m}^{-2} \cdot \text{s}^{-1}$), stomatal conductance (GS, $\text{mmolH}_2\text{O} \cdot \text{m}^{-2} \cdot \text{s}^{-1}$) and light-response curves were analyzed by Photosynthesis Assistance Software.

Results The daily variation of photosynthetic rate in different seasons presented a single peak curve (Figure 1). *Hemarthria compressa* has a strong photosynthetic ability in spring and summer. The statistical analysis showed that net photosynthetic rate has a distinct relationship with photosynthetically active radiation in four seasons. It also significantly related to intercellular CO₂ concentration, transpiration, stomatal conductance in summer and autumn. In spring all the determined indicators have no relativity. *Hemarthria compressa* has higher light saturation point in summer, it is $703 \text{ mol m}^{-2} \text{ s}^{-1}$ ($350 \text{ mol m}^{-2} \text{ s}^{-1}$ for autumn, $125 \text{ mol m}^{-2} \text{ s}^{-1}$ for winter, $318 \text{ mol m}^{-2} \text{ s}^{-1}$ for spring). And in winter, it has lower light compensation point of $3.91 \text{ mol m}^{-2} \text{ s}^{-1}$ ($23.4 \text{ mol m}^{-2} \text{ s}^{-1}$ for summer, $10.1 \text{ mol m}^{-2} \text{ s}^{-1}$ for autumn, $34.8 \text{ mol m}^{-2} \text{ s}^{-1}$ for spring).

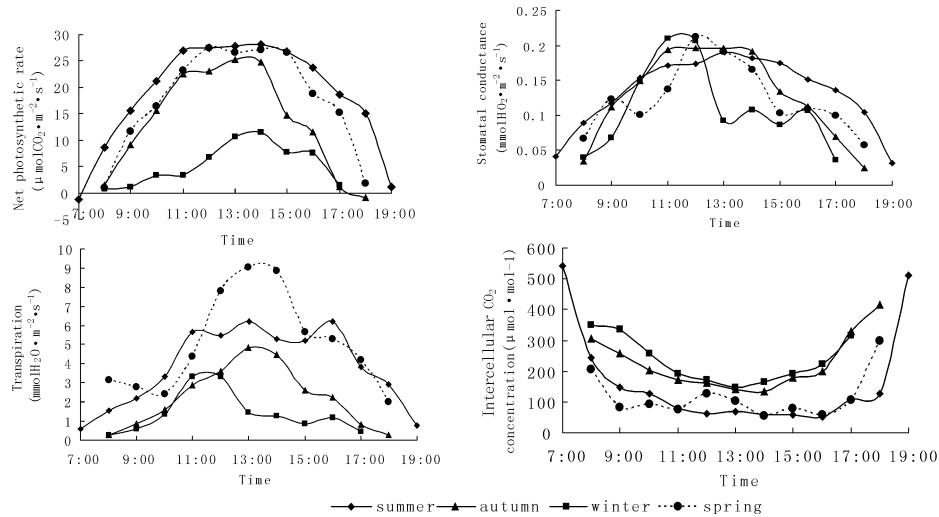


Figure 1 Diurnal variation of net photosynthetic rate, intercellular CO₂ concentration, stomatal conductance, transpiration rate in different seasons.

Conclusions *Hemarthria compressa* can make the best of the light and heat condition to cumulate organic matter in spring and summer. The low light compensation point in winter could adapt the low light condition. Due to the lower winter photosynthesis of this grass, we can improve the yield and quality of the hay production fields by overseeding other winter-season annual grasses in the winter.

Reference

Yang C.H., Zhang X.Q. (2006). *Hemarthria compressa*: growth behavior and multipurpose usages. *ACTA Prataculturae Sinica*, 15(suppl.) 215-216.