



University of Kentucky
UKnowledge

International Grassland Congress Proceedings

XXI International Grassland Congress / VIII
International Rangeland Congress

Net Photosynthesis Rate and Transpiration Rate of Algonquin with Different Growth Years

Lijun Xu

Chinese Academy of Agriculture Sciences, China

B. Wang

Beijing Forestry University, China

Q. Z. Sun

Chinese Academy of Agriculture Sciences, 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/21/12-2/24>

The XXI International Grassland Congress / VIII 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.

Net photosynthesis rate and transpiration rate of Algonquin with different growth years

L.J. Xu¹, B.Wang², Q.Z. Sun¹

¹Grassland Research Institute Of Chinese Academy Of Agriculture Science, Hohhot 010010, China. E-mail: xulijun_nmg@163.com; ²School of Soil and Water Conservation, Beijing Forestry University, Beijing 100083, China

Key words: Algonquin, net photosynthesis rate, transpiration rate

Introduction Algonquin is strong tolerance capability under drought condition. However, it can not survive more than 5 years in Chifeng city of Inner Mongolia. The photosynthesis rate (Pn) and the transpiration rate (Tr) of plants leave are the major driver of its growth. The study aimed to compare Pn and Tr of Algonquin with different growth years to find out the differences to deeply understand the suitability of Algonquin in this place.

Materials and methods Algonquin was seed in Chifeng city of Inner Mongolia (2003, 2005, 2006). The spot area was $2.5 \times 10 \text{m} = 25 \text{m}^2$. 15 healthy plants were selected, and was used a LI-6400 photosynthesis system (Licor Co., USA) to measure Pn and Tr. The measure time was from 7:00a.m to 7:00p.m and every 2 hours were to do them once.

Results and discussion Pn of 4a, which indicated that Algonquin growth years was 4 years, was higher than 1a and 2a (Figure 1), but their maximum of Pn for 1a, 2a and 4a were 13.02, 12.06 and 17.91 $\mu\text{molCO}_2/\text{m}^2/\text{s}$ at 11:00 a.m., and the minimum of Pn appeared 17:00~19:00p.m. Seen from the Figure 2, the transpiration daily trend of it showed that the transpiration rate were $1a > 4a > 2a$ at all. And the maximum Tr of 1a was 9.97 $\text{mmolH}_2\text{O}/\text{m}^2/\text{s}$ at 11:00a.m, and 2a and 4a were 3.36 and 4.14 $\text{mmolH}_2\text{O}/\text{m}^2/\text{s}$ at 15:00p.m, the minimum were 2.47, 1.01 and 1.60 $\text{mmolH}_2\text{O}/\text{m}^2/\text{s}$ separately and all appeared near 7:00a.m. This could indicate Pn and Tr of 1a both appeared at 11:00a.m, which indicated that the metabolism of Algonquin of 1a was the strongest at that time. That's, the accumulation of the matter was less. However, the maximum of Pn and Tr of 2a and 4a appeared different stages. They had time to accumulate the more energy. So they grew faster and stronger relatively.

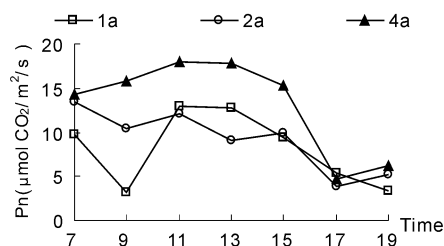


Figure 1 The daily trend of photosynthesis rate of Algonquin.

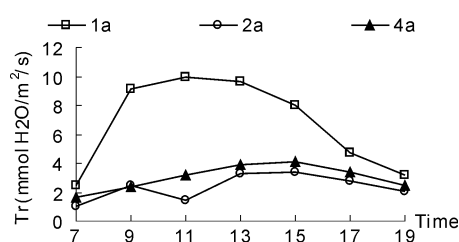


Figure 2 The daily trend of transpiration rate of Algonquin.

Conclusions As to different growth years of Algonquin, the trends of Pn and Tr were different. And the maximum of Pn and Tr of 1a both appeared at 11:00a.m, the maximum of Pn and Tr of 2a and 4a appeared different stages, 11:00 a.m and 15:00a.m.

References

- Zhao H., Yang Q-G, 2007. Characteristics of photosynthesis, transpiration and water use efficiency of wheat leaf in semi-arid rain feed region. *Agricultural Research in the Arid Areas* 25, 125-129.
- Zhang Mi., Wu J-B, 2006. Light response curve of dominant tree species photosynthesis in broadleaved Korean pine forest of Changbat Mountain. *Chinese journal of applied ecology* 17, 1575-1577.