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Exploring the water use efficiency of Quercus mongolica

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Abstract

The daily variation of leaf photosynthesis can reflect the ability of plants to carry out material accumulation and physiological metabolism in one day. It is also an important means to analyze environmental factors affecting plant growth and metabolism, which helps us to use light energy and resistance to different varieties of plants. Sexual understanding to better cultivate it. The transpiration of plants is closely related to their net photosynthetic rate. Water use efficiency is a comprehensive reflection of plant photosynthesis and transpiration characteristics, and its size can reflect the plant's ability to adapt to adversity. From the results of this study, the photosynthesis rate, transpiration rate, and stomatal conductance of the leaves of the Mongolian oak and the two-year-old Quercus mongolica were lower than the photosynthesis rate of the red and yellow leaves of the American red sorghum. The transpiration rate and stomatal conductance, while the water use efficiency of the annual leaves of Quercus mongolica and the leaves of the two-year-old Quercus mongolica are above the water use efficiency of the red leaves and the red leaves of the United States, and the annual Mongolian oak leaves are around 10 am. The water use efficiency of the leaves of the two-year-old Quercus mongolica was significantly higher than other times. Therefore, we can conclude that compared with the American red dragonfly, Mongolian oak has a strong adaptability to drought, suitable for cultivation in arid areas, and is resistant to extensive management.

Keywords

Quercus mongolica; American red dragonfly; water use efficiency; diurnal variation of photosynthetic parameters.

1. Introduction

Quercus mongolica, also known as eucalyptus, Mongolian oak, lobular shed, and Mongolian ridge, is a genus of genus and deciduous trees. It has about 450 species of genus and occupies the earth's terrestrial ecosystem[1]. In 1985, the International Union of Forestry Research Organization (IUFRO) established a working group on tree genetics. Quercus mongolica is a representative species of deciduous mites in northern China. It is widely distributed in the three northeastern provinces of China and Inner Mongolia. It is the main timber species in China and the main species of secondary

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deciduous broad-leaved forests in Northeast China. Mongolian oak has hard wood, clear and beautiful texture, and has anti-corrosive biological characteristics. It can be used as economic material. Mongolian oak has developed root system and strong adaptability, which can better protect slope, resist and culvert. The role of water and soil conservation; its branches have higher heat and can be used as fuelwood; the leaves of Mongolian oak can also be used to feed silkworms and raise animals. Quercus mongolica has important ecological and economic value [2-4].

Therefore, Mongolian oak has become a secondary protected tree species in China. However, people did not really recognize the growth characteristics of Quercus mongolica, and still deforested in the case of poor growth of its stand, which greatly damaged the resources of Quercus mongolica. Quercus mongolica is a dominant species that has been preserved in the process of retrograde succession. It is a type of community formed in habitats where forests are repeatedly damaged and environmental conditions are extremely poor. As some scholars have pointed out, if this tree species is ruined again, the last line of defense of the forest will collapse, and the ecological environment will deteriorate further. The consequences are unimaginable. The secondary forests with Quercus mongolica as a group have a large proportion in the northeast forest area of China, accounting for 15%-20% of the forest land. The operation of these Mongolian oak forests improves the forest resources and improves the forest land utilization rate in the northeast forest areas. Improving the environmental quality of the region is of great significance.

2. Mechanical Analysis

Determine the dry matter quality and water consumption of the plant during the longer-term growth process, and express the water use efficiency by how many grams of dry matter per kilogram of water is produced: WUE = g / kg. This method is mostly used for WUE measurement at the group and individual level, but since the group WUE mainly depends on the water balance of crops and soil, the water consumption of crops through the soil is often difficult to measure and can only be estimated by the water balance equation, so the field crops The group's WUE is not easy to obtain, which limits its application. The WUE at the individual level describes the difference in transpiration efficiency of different crops and the difference in WUE between different species within the species. It is almost impossible to measure the transpiration evaporation in the field measurement because it is difficult to separate the transpiration evaporation. Therefore, this method is mostly used in the selection research of excellent varieties and varieties of crops and trees, and thus is more suitable for use in control experiments. In theory, it is the most accurate way to determine the effect of water availability on dry matter production. However, in the wild, this method still has some difficulty and error, and requires a lot of detailed and cumbersome work, and it is expensive.

3. Data Collection by Questionnaire Survey

Through observation, we can conclude that the water use efficiency of the annual leaves of Quercus mongolica, the water use efficiency of the two-year-old Quercus mongolica leaves, the water use efficiency of the American red oak leaves, and the water use efficiency of the American red oak green leaves are the largest. The peaks appear at 10 am. The water use efficiency of the annual leaves of Quercus mongolica and the water use efficiency of the leaves of the two-year-old Quercus mongolica were significantly higher than the water use efficiency of the American red oak leaves and the water use of the American red oak green leaves during the period from 8 am to 12 noon. Efficiency, and during this time, the water use efficiency of the annual leaves of Quercus mongolica and the water use efficiency of the two-year-old Quercus mongolica leaves increased rapidly and rapidly, which is roughly the water use efficiency of American red oak leaves and the American Red Dragonfly. The rate of increase in water use efficiency of green leaves is about ten times that of the rate of decline. On the whole, the water use efficiency of the red sorghum red leaves of the United States is similar to the daily variation curve of the water use efficiency of the red saplings of the United States. They all have a peak at 10 am and a trough around 14 pm, 14 pm After the point, their water use efficiency showed a slow upward trend with time. The water use efficiency of the annual leaves of Quercus

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mongolica and the water use efficiency of the leaves of the two-year-old Quercus mongolica were similar, and the water use efficiency of the two-year-old Quercus mongolica leaves was almost above the water use efficiency of the annual Mongolian oak leaves. The water use efficiency of the annual leaves of Quercus mongolica and the water use efficiency of the leaves of the two-year-old Quercus mongolica showed a second peak at 14 pm and 16 pm, respectively. The water use efficiency of the annual leaves of Quercus mongolica has two lows, respectively. At 12 noon and 14 pm, the water use efficiency of the two-year-old Quercus mongolica leaves occurred at 14 pm.

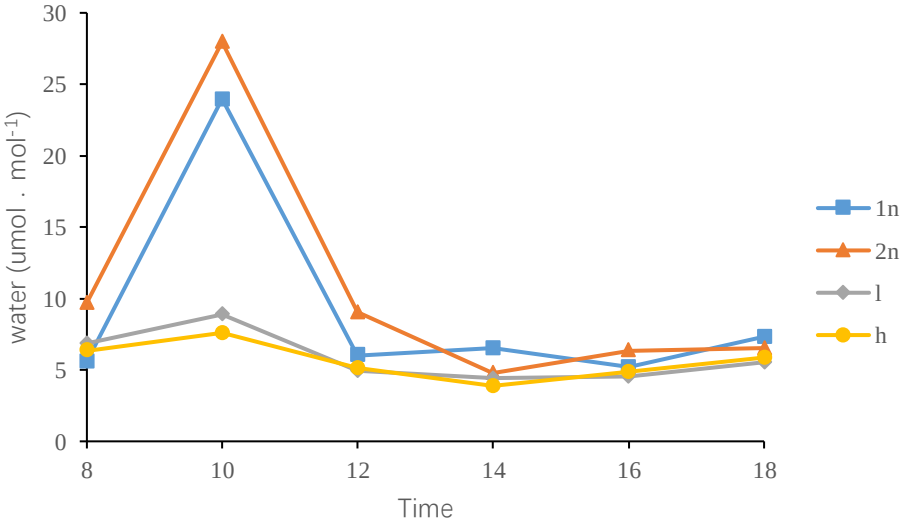

Figure 1. Daily change line chart

4. Conclusion

The daily variation of photosynthesis can reflect the ability of plants to carry out material accumulation and physiological metabolism in one day. It is also an important means to analyze environmental factors affecting plant growth and metabolism, which helps us to use light energy and resistance to different varieties of plants. Sexual understanding to better cultivate it.

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