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

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Key words: Algonquin, net photosynthesis rate, transpiration rate

Introduction Algonquin is tolerant to 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 was designed to compare Pn and Tr of Algonquin in different years to better understand the suitability of Algonquin on this site.

Materials and methods Algonquin was planted in Chifeng city of Inner Mongolia (2003, 2005, 2006). The plot area was 2.5×10m=25m^2. 15 healthy plants were selected, and we used a LI-6400 photosynthesis system (Licor Co., USA) to measure Pn and Tr. The measure time was from 7:00a.m to 19:00p.m and we measured them once every 2 hours.

Results and discussion Pn of 4a, which indicated that Algonquin growth years was 4 years old, 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$\mu molCO_2/m^2/s$ at 11:00 a.m., and the minimum of Pn appeared 17:00~19:00p.m. Seen from Figure 2, the daily trend in transpiration showed that the rate was 1a>4a>2a at all times. And the maximum Tr of 1a was 9.97 $mmolH_2O/m^2/s$ at 11:00a.m, and 2a and 4a were 3.36 and 4.14 $mmolH_2O/m^2/s$ at 15:00p.m, the minimum were 2.47, 1.01, and 1.60 $mmolH_2O/m^2/s$, respectively, and all appeared near7:00a.m. Since Pn and Tr of 1a both appeared at 11:00a.m, it appears that the physiological activityof Algonquin of 1a was highest at that time, but the accumulation of the matter was less. Whereas, 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.

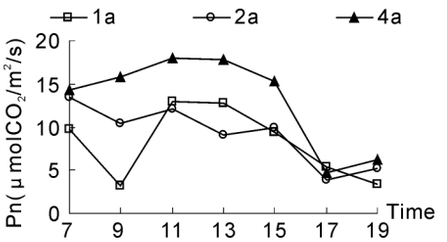

Figure 1 *The daily trend of photosynthesis rate of Algoquin.*

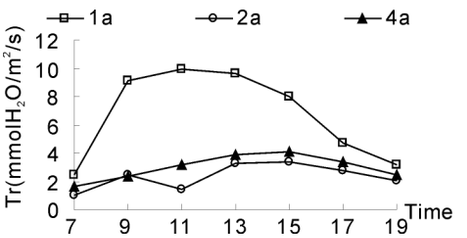

Figure 2 *The daily trend of transpiration rate of Algoquin.*

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, 11:00a.m and 15:00a.m.

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