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研究报告

模拟水分胁迫对水曲柳光合速率及水分利用效率的影响

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摘要

经过3年人工模拟水分胁迫,研究了不同水分处理下水曲柳光合特征及其水分利用效率的变化.结果表明,在中度水分胁迫 (MW) 下, 水曲柳的光合速率和水分利用效率比对照组均有所提高, 而在重度水分胁迫(LW)下则分别降低了7.26%和1.13%.长期的中度水分胁迫使水曲柳的光合潜力得到充分发挥,其适应性也好于重度水分胁迫.对照组水曲柳的光合速率日变化呈单峰曲线,MW组和LW组则均呈“双峰”曲线;对照组水曲柳水分利用率的日变化呈现双峰曲线,而MW组和LW组则呈现波动趋势,无明显的波峰和波谷.这与水曲柳在不同水分处理下的生理特性和环境因子的日进程密切相关.

关键词 水分胁迫；光合速率；水分利用效率；日变化；水曲柳

分类号

Effects of simulated water stress on photosynthesis rate and WUE of Fraxinus mandshurica

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Abstract

This paper studied the photosynthesis characteristics and water use efficiency (WUE) of *Fraxinus mandshurica* under three years simulated water stresses 85%～100% (CK),65%～85% (MW) and 45%～65% (LW) of field water-holding capacity.The results showed that in comparing with CK,the photosynthesis rate and WUE were higher in treatment MW,but decreased by 7.26% and 1.13%,respectively in treatment LW,indicating that *Fraxinus mandshurica* could fully exert its photosynthesis potentiality under long-term medium water stress,and was more resistant to moderate than to critical water stress.In treatment CK,the diurnal change of P_n and WUE was a single and a double peak curve,respectively,while in treatments MW and LW,the diurnal change of *Pn* was a double peak curve,but that of WUE had no significant peak,which correlated not only to the physiological characteristics of *Fraxinus mandshurica* under different water stress,but also to the diurnal change of environmental factors.

Key words

Water stress Photosynthesis rate Water use efficiency Diurnal change Fraxinus mandshurica

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