

呼伦贝尔草甸草原不同土壤水分梯度下羊草的光合特性

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摘要: 为探索气候变化引起的干旱可能对呼伦贝尔草甸草原生产力造成的影响, 利用 Li6400 便携式光合测定系统对呼伦贝尔草原 4 个土壤水分梯度下羊草的光合生理指标进行测定。结果表明: 羊草叶片净光合速率的日变化在土壤质量含水量为 (40±1)%、(20±1)% 及 (10±1)% 的条件下呈双峰曲线, 峰值分别出现在 8:00 和 16:00 有明显的光合午休现象, 在干旱胁迫 (土壤质量含水量为 (5±1)%) 条件下变化趋势平缓, 曲线双峰特征不明显, 净光合速率大幅下降; 叶片蒸腾速率和气孔导度的日变化趋势均呈双峰曲线; 不同土壤水分梯度下羊草叶片胞间 CO₂ 浓度的日变化与净光合速率日变化趋势相反。通过光响应的研究表明, 土壤水分胁迫使最大净光合速率、光饱和点、表观量子效率以及水分利用效率降低, 而光补偿点升高。干旱胁迫降低了呼伦贝尔草甸草原植被的光合生产能力, 从而可能导致草地生产力大幅下降。

关键词: 羊草; 土壤水分梯度; 干旱胁迫; 光合作用; 光响应

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Photosynthetic characteristics of *Leymus chinensis* under different soil moisture grades in Hulunber prairie

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Abstract: In order to understand the influence of drought stress on hulunber grassland productivity, the photosynthetic characteristics of *Leymus chinensis* with four soil moisture grades were measured with Li6400 Portable Photosynthesis System in hulunber prairie. The results indicated that the diurnal patterns of net photosynthetic rate (P_n) of *Leymus chinensis* presented two peaks curve under moisture treatments of 40±1%, (20±1)% and (10±1)%. The first peak appeared at 8:00 and the sub-peak at 16:00 with an obvious mid-depression. Under drought stress conditions (5±1)%, the net photosynthetic rate reduced greatly with unobvious diurnal variation. The diurnal variations of transpiration rate and stomatal conductance presented double peak curves. The diurnal variation of intercellular CO₂ concentration was opposite with that of net photosynthetic rate. Under soil water stress conditions, maximum photosynthetic rate, light saturation point, apparent quantum yield and water use efficiency of *Leymus chinensis* decreased and light compensation point increased. Therefore, drought stress could reduce the photosynthetic ability of grassland vegetation, and result in a large decline of Hulunber meadow ecosystem productivity.

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