

研究论文

# 塔里木河下游荒漠河岸林群落土壤呼吸及其影响因子

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**摘要** 利用LI-8100土壤碳通量自动测定仪监测塔里木河下游荒漠河岸林群落土壤呼吸的日变化动态, 分析其土壤呼吸与环境因子的关系, 比较二者的差异。结果表明: (1) 胡杨和柽柳群落土壤呼吸的日变化过程相同, 最大值出现时间一致, 呈单峰值曲线, 但是不同月份最大值出现时间不同; (2) 胡杨群落的土壤呼吸速率大于柽柳群落的; (3) 胡杨和柽柳群落的土壤呼吸速率与距地表2cm处气温之间存在显著的指数关系, 但是不同植物类型的土壤呼吸对温度的敏感性有所不同; (4) 胡杨和柽柳群落的土壤呼吸速率与土壤水分都存在显著的线性关系; (5) 通过多元回归分析表明, 塔里木河下游76%~93%左右的荒漠河岸林群落土壤呼吸速率受温度和水分共同控制。

关键词 [土壤呼吸](#) [荒漠河岸林](#) [胡杨](#) [柽柳](#) [近地表气温](#) [土壤水分](#)

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## Soil respiration of desert riparian forests in the lower reaches of Tarim River as affected by air temperature at 10cm above the ground surface and soil water

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**Abstract** In order to understand the controlling environmental factors of soil organic carbon cycling in the lower reaches of the Tarim River, we studied daily variation of soil respiration and its relationship with air temperature at 10 cm above ground surface and soil water contents in riparian forests in sections of Karerdayi and Alagan. Measurements of soil respiration were made with a LI-8100 soil CO<sub>2</sub> efflux system. Nonlinear regression analysis was performed with SPSS13.0. We observed that: (1) the daily variation of soil respiration was fairly consistent between *Populus euphratica* and *Tamarix* spp. communities, with diurnal variation curve of soil CO<sub>2</sub> emissions displaying a single peak and the maximum rate of soil CO<sub>2</sub> efflux occurring at the same time; (2) the timing for the occurrence of maximum rate of soil CO<sub>2</sub> efflux varied monthly; (3) the rates of soil respiration under the forests of *Populus euphratica* was significantly greater than under the forests of *Tamarix* spp.; (4) an exponential model can be used to describe the relationship between soil respiration and air temperature at 10 cm above ground surface, with the sensitivity of soil respiration to temperature differing between different vegetation types; (5) a liner model can better describe the relationship between soil respiration and soil water content; and (6) air temperature at 10 cm above the ground surface and soil water content together controlled the rates of soil respiration.

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n and explained 76%~93% of the variance in desert riparian forests of the lower reaches of Tarim River.

**Key words** soil respiration hungriness riverside forest *Populus euphratica* *Tamarix* spp. air temperature at 10cm above the ground surface soil water content

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