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研究报告

西鄂尔多斯地区强旱生小灌木的水分参数

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摘要 应用PV技术研究了西鄂尔多斯地区绵刺、红沙、四合木和霸王柴4种超旱生灌木的水分关系参数膨压(ψ_P)、细胞弹性模量(ε)、细胞体积比(RCV) 及其相互关系. 结果表明：在4种荒漠旱生灌木中, 红沙保持最大膨压的能力最强(a=2.4593). 不同荒漠旱生灌木保持膨压的方式不同：绵刺通过弹性调节保持膨压(ε_{max}=8.4005 MPa)；红沙通过渗透调节来保持膨压($\psi_{\pi 100}$=-3.1302 MPa；ψ_0=-3.5074 MPa)；四合木通过渗透调节和弹性调节的协同作用来维持膨压；霸王柴通过渗透调节来保持膨压, 而弹性调节能力较弱. 绵刺具有柔软而高弹性的细胞壁, 是构成其根茎系统快速吸收和传导水分能力的因素之一. 四合木具有较柔软而高弹性的细胞壁且 ψ_P的变化随*RCV*减小而趋于缓慢, 说明四合木具有较强的持水能力和抗脱水能力.

关键词 强旱生小灌木 渗透调节 弹性调节 耐旱性

分类号

Water parameters of desert xeric shrubs in west Erdos region.

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Abstract

By using PV technique, this paper studied the turgor pressure (ψ_P), cell elastic modulus (ε), and relative cell volume (*RCV*) of super xerophytes *Potaninia mongolica*, *Reaumuria soongorica*, *Tetraena mongolica* and *Zygophyllum xanthoxylon* in west Alashan, with the relationships among the parameters analyzed. The results showed that *R. soongorica* had the strongest ability to maintain maximum turgor pressure (a=2.4593). The four plants maintained their turgor pressure by different ways, *i. e.* , *P. mongolica* maintained it by elastic adjustment (ε_{max}=8.4005 MPa),*R. soongorica* by osmotic adjustment ($\psi_{\pi 100}$=-3.1302 MPa; ψ_0=-3.5074 MPa), *T. mongolica* by both osmotic and elastic adjustment, and *Z. xanthoxylon* by osmotic adjustment, which had weak adjustment ability. The cell wall of *P. mongolica* was soft and highly elastic, benefiting to the water absorption by root and stem and to the fast water transmission.*T. mongolica* also had relatively soft and high elastic cell wall, and its ψ_P and ε changed slowly with decreasing RCV, suggesting that this plant had strong ability of holding water and resisting dehydration.

Key words desert xeric shrub osmotic adjustment elastic adjustment drought tolerance

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