

不同土壤水分条件对中国沙棘和俄罗斯沙棘的光合和蒸腾作用的影响

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摘要: 在野外不同生境和田间不同干旱条件下, 对中国沙棘(*Hippophae rhamnoides sinensis*) 和俄罗斯沙棘(*Hippophae rhamnoides*) 的光合和蒸腾作用的日进程进行研究后发现: 随着土壤水分含量的增加, 沙棘的光合速率和蒸腾速率随之升高。在不同的土壤水分条件下, 光合作用和蒸腾作用的日进程表现为双峰或单峰曲线, 峰值的出现时间也随土壤水分条件的变化而变化。中国沙棘光合速率的日平均值表现为雌株高于雄株, 而俄罗斯沙棘表现为水分条件适宜时雄株略高于雌株, 受到干旱胁迫后雌株大于雄株; 且俄罗斯沙棘的光合能力优于中国沙棘。俄罗斯沙棘蒸腾速率的日均值为雌株高于雄株, 中国沙棘雌雄株蒸腾速率的差异规律不一致。光合速率和蒸腾速率与土壤含水量的回归分析表明: 二者呈显著的正相关, 回归方程为一元二次方程, 复相关系数接近 1。

关键词: 沙棘; 干旱胁迫; 光合速率; 蒸腾速率

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Effects of Photosynthetic and Transpiration Rate on *Hippophae Rhamnoides Sinensis* and *Hippophae Rhamnoides* in Different Soil Water Condition

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Abstract: Photosynthetic rate and transpiration rate on *Hippophae rhamnoides sinensis* and *Hippophae rhamnoides* were studied in different soil water conditions. It is found that photosynthetic rate and transpiration rate increase with increased soil water content. The day course of photosynthetic rate and transpiration rate is of single summit or twin summits in different soil water conditions, and time for the summit varies with soil water content. With suitable water content, the mean photosynthetic rate of the male of *Hippophae rhamnoides* is higher than the mean photosynthetic rate of the female of *Hippophae rhamnoides*. Under drought stress, the female of *Hippophae rhamnoides* is higher than the male. The mean photosynthetic rate of the female of *Hippophae rhamnoides sinensis* is higher than the mean photosynthetic rate of the male. The photosynthetic capacity of *Hippophae rhamnoides* is higher than that of *Hippophae rhamnoides sinensis*, and the mean transpiration rate of the female of *Hippophae rhamnoides* is higher than the mean transpiration rate of the male of *Hippophae rhamnoides*. The mean transpiration rate of the male and female of *Hippophae rhamnoides sinensis* do not have any differences. The regression analysis shows that the relationship of photosynthetic rate and transpiration rate with soil water content can be expressed by $y = a + bx + cx^2$.

Keywords: *Hippophae rhamnoides*; photosynthetic rate; transpiration rate; drought stress

中国沙棘为野生灌木, 分布在我国内蒙古、陕西、山西、甘肃、宁夏、河北、辽宁等省区, 内蒙古是我国沙棘的主要分布区之一, 集中分布在乌兰察布盟、鄂尔多斯市和赤峰市。50年代初至80年代中期, 人们在对黄土高原野生灌木树种资源的调查中, 注意到了沙棘在各种立地上的分布生长状况及其表现出的抗逆

性。在对沙棘生物学特性和水保作用进行初步研究的基础上, 确认沙棘是少有的优良水保和薪炭林树种^[1]。俄罗斯大果沙棘为育成品种, 80年代后被大面积引种。沙棘作为一种雌雄异株植物, 雌、雄株不仅在种的繁衍中具有重要作用, 作为一个水保树种, 各自对环境的适应性和光合生产力也极为重要。

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