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研究论文

科尔沁沙地几种乔灌木树种耐受极端土壤水分条件与生存能力野外实地测定

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摘要 用有限面积法野外实地测定了科尔沁沙地几种常见乔灌木树种所能耐受的极端临界土壤含水量和极端干旱条件下的生存能力。有限面积法通过限制植物根系水平分布的范围，降低了根系分布区土壤含水量的空间异质性，提高了土壤含水量测定结果的准确性。通过减少植物的吸水范围，加重了植物的受旱程度，有利于对植物耐受极端干旱能力的检验。测定是在植物野外实际生存状态下进行，测定结果更加符合实际情况。野外实地测定结果表明：按从低到高的顺序，山杏、小叶锦鸡儿、差巴嘎蒿、黄柳、榆树、杨树的最低临界土壤含水量分别是0.82%、0.87%、1.61%、1.89%、2.04%和2.27%，形成了一个梯度顺序，反映了几个树种耐旱性的差异和适宜生境条件的不同。植物在极端干旱条件下的生存能力表现为叶片枯黄、萎蔫、脱落和枝条从上到下逐渐干枯，但枝条基部和根系仍然存活，并保持较长时间的存活能力，在遇到适宜的降水后能继续萌发、生长。这一特性具有蓄种、保种作用，对维持荒漠植物种群稳定与种源续存具有重要意义。测定结果对评价物种的抗旱能力和维持人工林群落稳定具有参考价值。

关键词 有限面积法 _ 最低临界土壤含水量 _ 科尔沁沙地

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Determination of the ability of several tree and shrub species to endure and survive extreme aridity with methods of limited areas under field condition in Horqin Sandy Land

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Abstract Using limited-areas methods, the ability of several tree and shrub species to endure and survive extreme aridity under field condition in Horqin Sandy Land was studied, and the lowest critical soil water content which is endurable for each of these species was determined. By limiting the horizontal distribution extent of plant root systems, the limited-areas methods can decrease spatial heterogeneity of soil water content and improve the accuracy of determination of soil water content. Also, this method has the advantage of worsening the aridity endured by the plant species, which is helpful for testing the ability of these species to endure aridity. Our results showed that, the critical soil water contents which are endurable for Prunus sibirica L., Caragana microphylla Lam., Artemisia halodendron Turcz. ex Bess., Salix gordejevii Cheng et Skv., Ulmus pumila L., Populus pseudo-simonii Kitag. are 0.82%, 0.87%, 1.61%, 1.89%, 2.04% and 2.27%, respectively. This result is useful for evaluating the ability of these species to endure aridity, and has some important implications for establishing artificial plantations that have high stability.

Key words limited-areas methods; the lowest critical value of soil water content; Horqin Sandy Land

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