不同初始含水率条件下的微咸水入渗实验　Saline Water Infiltration with Different Initial Moisture Contents

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关键词：　微咸水 初始含水率 累积入渗量 湿润锋 一维代数模型

摘　要：　针对矿化度均为3　g/L的微咸水入渗时，土壤初始含水率对土壤入渗过程的影响，采用室内均匀土柱一维垂直入渗实验方法，分别对初始含水率为2.25%、8.18%、13.12%、16.40%的土柱入渗过程进行了研究。分析了不同土壤初始含水率对累积入渗量和湿润锋推进深度以及土柱剖面含水率的影响。采用Kostiakov模型对累积入渗量和时间的关系进行了拟合，结果表明累积入渗量与初始含水率呈负相关关系。采用幂函数将初始阶段的湿润锋推进深度与时间关系进行拟合，结果表明二者呈明显的幂函数关系，且初始含水率越高湿润锋推进速度越慢。采用一维代数模型对土壤剖面含水率进行分析发现，初始含水率越高，模型的理论值越准确。总之微咸水在土壤中的入渗能力与初始含水率有着密切关系，随着入渗过程的进行，初始含水率对入渗能力的影响逐渐减小。　 The effect of the infiltration process with initial moisture contents of 2.25%, 8.18%, 13.12% and 16.40% was examined by indoor uniformity earth pillar experiments. The infiltration water mineralization degree was 3　g/L. Both cumulative infiltration and wetting front vs. time with different initial moisture contents infiltrated by saline water were analyzed. Fitting the relationship between cumulative infiltration and time with Kostiakov model, the results showed that the initial moisture content and soil infiltration capacity were negatively correlated. The relationship between wetting front advancing depth and time was fitted by power function. It proved that power function was obvious between them, the lower the initial moisture content was, the slower wetting front advancing rate would be. A 1　D algebraic model was used to analyze soil moisture profiles; it was found that theoretical values were more accurate as the initial moisture contents increased. In brief, there was an intimate connection between soil infiltration capacity and initial moisture contents infiltrated by saline water. As the infiltration process was carried out, the influence of initial moisture contents on infiltration capacity gradually decreased.

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