

## 降雨过程中碱性坡耕地土壤侵蚀的研究

### Erosion of sodic soil in sloping field during rainfall process

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中文摘要:

坡地土壤侵蚀的治理是水土保持工作的主要任务之一。为了研究碱性坡耕地土壤在降雨过程中的入渗和侵蚀特性, 该试验采用室内人工降雨模拟器方法对两种不同碱度的壤质黄土在不同坡度条件下的入渗和侵蚀进行了调查。试验土壤的可交换钠百分比 (ESP) 分别为2.8和52.0, 土壤表面坡度为5%~25%。试验数据显示, 在降雨过程中, 土壤的入渗能力随ESP的减小或表面坡度的增大而增加, 土壤的可侵蚀性随土壤ESP或表面坡度的增大而增加。两种ESP的土壤在各种表面坡度情况下的土壤累积侵蚀量随累积降雨量直线增加, 并随土壤坡度的增大而增加。但当土壤坡度大于15%时, 高ESP土壤的累积侵蚀量随土壤坡度的增加远大于低ESP土壤的增加。USLE经验公式较好地预测了低ESP土壤的坡度系数, 但不能精确计算高ESP土壤的坡度系数。由于土壤细沟侵蚀的发生, WEPP模型低估了两种ESP壤在大坡度情况下的坡度系数。

英文摘要:

Management of soil erosion in sloping fields is one of the main tasks of water and soil conservation. In order to investigate infiltration and erosion characteristics of soil in sloping fields during rainfall process, infiltration and erosion of loamy loess soils with two ESP levels under different slopes were conducted using a rain simulator in laboratory. Exchangeable sodium percentage (ESP) of soils was 2.8 and 52.0 respectively, and soil slope was within the range of 5%~25%. The experimental data indicated that soil infiltration rate increased with decreasing ESP or increasing slope under the rainfall condition, and soil erodibility increased with increase of soil ESP or soil slope. Accumulative erosion linearly increased with accumulative rainfall amount under various ESP levels and land slopes, it also increased with increased slope angle. However, the increasing gradient of soil erosion against slope was much faster in high ESP soil than in low ESP soil with greater land slopes (>15%). The empirical formula of USLE calculated the slope factor well for low ESP soil, but poorly for high ESP soil. The WEPP model underestimated slope factor at great slope steepness for both ESP soils due to hill erosion.

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