

湘南红壤丘陵区不同生态模式水土流失特征

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摘要: 基于 2011 年对湖南省祁阳县标准径流场进行的定位观测, 研究 8 种不同生态模式自然降雨条件下地表径流及土壤侵蚀状况。结果表明: (1) 研究区全年发生地表径流 17 次, 发生月份为 3—11 月, 其中有 13 次分布在 5、6 月和 8—10 月, 地表径流与降雨分布特征总体一致。(2) 不同生态模式年径流量平均为 865.99 m³/hm², 变幅为 238.12~1 422.08 m³/hm², 年土壤侵蚀量平均为 25.163 t/hm², 变幅为 0.072~67.570 t/hm²。不同生态模式间年地表径流量和土壤侵蚀量差异均达到极显著 ($p < 0.01$)。 (3) 各模式地表径流量表现出随着降雨量增加而增加的特点; 大雨量降雨是导致土壤侵蚀产沙的主要因素。 >50 mm 的大雨量降雨和高强度降雨对红壤坡地水土流失具有明显影响。降雨量对不同生态模式土壤含水量的影响随着时间的推移表现为“强, 中, 弱”的特点, 各模式土壤含水量的动态变化趋势大致相同, 与降雨量的动态变化具有良好的 consistency。 (4) 在湘南坡地开发利用中, 梯田油茶模式在油茶幼龄期间水土流失十分严重, 在 8 种处理模式中仅次于撂荒地(对照)与顺坡作物模式; 梯田油茶+稻草覆盖模式、梯田油茶+花生+植物篱模式及梯田油茶+豆科牧草模式水土保持效果明显。

关键词: 红壤丘陵区; 生态模式; 地表径流; 土壤侵蚀

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Characteristics of Soil and Water Loss Under Different Ecological Planting Patterns in Red Soil Hilly Region of Southern Hunan Province

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Abstract: The runoff and soil loss under different ecological planting patterns were studied by monitoring runoff plots located in Qiyang county, Hunan province during 2011. The results showed that: (1) There were 17 times runoff which occurred from March to November, 2011, 13 times of them concentrated in May, June and August to October. The distribution characteristics of runoff was the same as rainfall. (2) The average annual total runoff of 8 ecological patterns was 865.99 m³/hm² with a range from 238.12 m³/hm² to 1 422.08 m³/hm². The average annual total soil loss of 8 treatments was 25.163 t/hm² with a range from 0.072 t/hm² to 67.570 t/hm². The differences of annual runoff and soil loss among different ecological patterns were both significant ($p < 0.01$). (3) The runoff under different ecological patterns was increasing with the rainfall increasing; rainfall was one of the most important factors affecting soil loss. The large rainfall (>50 mm) and high intensities rain had significant effects on losses of soil and water in red soil sloped land. The effects of precipitation on soil moisture content under different ecological patterns showed the characteristics of “strong, general, weak” from spring to autumn. The dynamic change of soil moisture content under each planting pattern was almost the same and changed with each rainfall. (4) The soil and water losses of treatment with tea-oil tree planted in terrace was very serious when tea-oil tree was young, losses amount was only less than the treatments of the wasteland pattern (control) and natural sloped

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