

研究报告

黄土区次降雨条件下林地径流和侵蚀产沙形成机制

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摘要

以黄土区两种常见森林植被(次生山杨林和人工油松林)长期定位观测试验为基础,从水量平衡和径流产沙机理出发,分析了次降雨条件下两种林地和荒地坡面产流产沙过程.结果表明,次降雨量在5.0~50.0 mm范围内,油松林和山杨林的林冠和枯枝落叶层总截留率分别为15.45%~56.80%和20.56%~47.81%,且随降雨量的增大而减小.与荒地相比,林地土壤入渗性能显著增强,尤其是0~20 cm土层.分析表明,在一般降水条件下林地无径流产生;而在降雨雨强为2.5 mm·min⁻¹和历时30 min条件下,山杨林地无地表径流产生,荒坡地的径流流速和径流挟沙浓度均为油松林地的23.5倍,而其径流剪切力和径流能量均为后者的8倍;油松林地的径流量和产沙量比荒地分别减少了87.6%和99.4%,与径流小区多年(1988~2000)观测平均值(分别为87.0%和99.9%)相近.

关键词 [水土保持,产流产沙,森林植被,黄土高原](#)

分类号

Generation mechanism of woodland runoff and sediment on Loess Plateau under hypo-rainfall

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Abstract

Based on the long-term observation and from the viewpoints of water balance and runoff-and sediment generation, this paper studied the generation processes of runoff and sediment on two typical woodlands, artificial *P. tabulaeformis* and secondary natural *P. dadidiana*, and uncultivated slope land in Loess Plateau under hypo-rainfall. The results showed that within the range of 5.0~50.0 mm rainfall, the total interception of canopy and litter was 15.45%~56.80% for *P. tabulaeformis* and 20.56%~47.81% for *P. dadidiana*, and decreased with increasing rainfall. Woodlands had a higher soil water infiltration capacity than uncultivated slope-land, especially in 0~20 cm soil layer. Both the two woodlands did not generate runoff under regular rainfall. Under the assumed rainfall of 2.5 mm·min⁻¹ intensity and 30 min duration, *P. dadidiana* stand did not produce runoff, but the runoff velocity and sediment-carrying capacity of uncultivated slope-land were 23.5 times, and runoff shearing stress and

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energy were 8 times as much as *P. tabulaeformis* stand. The runoff and sediment generation on *P. tabulaeformis* stand decreased by 87.6% and 99.4%, respectively, compared with those on uncultivated slope-land, which was well accorded with the average observed value in runoff plots during 1988~2000. The theoretical analysis on the generation mechanism of woodland runoff and sediment may be effective to evaluate the benefits of forest in soil and water conservation.

Key words

[Soil and water conservation](#) [Runoff and sediment generation](#) [Forest stand](#)
[Loess Plateau](#)

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