

## 神府东胜煤田弃土弃渣体径流产沙过程的野外试验

李建明<sup>1</sup>, 王文龙<sup>1,2\*\*</sup>, 王贞<sup>3</sup>, 罗婷<sup>4</sup>, 李宏伟<sup>5</sup>, 金剑<sup>6</sup>

(<sup>1</sup>西北农林科技大学水土保持研究所/黄土高原土壤侵蚀与旱地农业国家重点实验室, 陕西杨凌 712100; <sup>2</sup>中国科学院 水利部水土保持研究所, 陕西杨凌 712100; <sup>3</sup>中国水电顾问集团华东勘测设计研究院, 杭州 310014; <sup>4</sup>杭州大地科技有限公司, 杭州 310000; <sup>5</sup>西北农林科技大学资源环境学院, 陕西杨凌 712100; <sup>6</sup>黄河水利委员会西峰水土保持科学试验站, 甘肃庆阳 745000)

A field experiment of runoff and sediment yielding processes from residues in Shenfu-Dongsheng Coalfield.

LI Jian-ming<sup>1</sup>, WANG Wen-long<sup>1,2</sup>, WANG Zhen<sup>3</sup>, LUO Ting<sup>4</sup>, LI Hong-wei<sup>5</sup>, JIN Jian<sup>6</sup>

(<sup>1</sup>State Key Laboratory Erosion and Dryland Farming on the Loess Plateaus, Institute of Soil and Water Conservation, Northwest A&F University, Yangling 712100, Shaanxi, China; <sup>2</sup>Institute of Soil and Water Conservation, Chinese Academy of Sciences and Ministry of Water Resources, Yangling 712100, Shaanxi, China; <sup>3</sup>Huadong Institute of Water Conservancy and Hydropower Survey and Design Hydrochina Engineering Consulting Corporation, Hangzhou 310014, China; <sup>4</sup>Hangzhou Earth Science and Technology Co., Ltd, Hangzhou 310000, China; <sup>5</sup>College of Natural Resources and Environment, Northwest A&F University, Yangling 712100, Shaanxi, China; <sup>6</sup>Xifeng Experimental Station of Soil and Water Conservation, Qingyang 745000, Gansu, China)

摘要

参考文献

相关文章

全文: PDF (924 KB) HTML (KB) 输出: BibTeX | EndNote (RIS) 背景资料

摘要

采用野外模拟降雨试验方法,研究了神府东胜煤田开采造成的弃土弃渣体产流产沙规律及其减水减沙效益.结果表明:随降雨强度的增大,弃土弃渣体产流的起始时间呈递减趋势,且差异达几倍至十几倍.弃渣体比弃土体更快到达稳定流速,平均流速大小为弃土体>沙多石少弃渣体>沙少石多弃渣体.弃土弃渣体产流6 min后的径流率达到稳定,与降雨强度呈显著相关.弃土弃渣体侵蚀主要发生在产流开始后的前6 min,弃土体产流后前6 min的平均含沙量是6 min后的0.43~4.27倍,弃渣体为1.43~54.93倍.弃土体和沙多石少弃渣体径流量与降雨强度呈线性函数关系,沙少石多弃渣体呈幂函数关系.弃土体和沙少石多弃渣体的次侵蚀量与降雨强度之间分别呈指数函数和幂函数相关.弃土体侵蚀量与径流量呈线性函数关系.在降雨强度为1.0和1.5 mm·min<sup>-1</sup>条件下,弃渣体采用鱼鳞坑及植被保护的产流滞后降雨时间为24 min,减水效益为29.5%~52.9%,减沙效益为85.7%~97.9%.

关键词: 弃土弃渣体 野外降雨试验 产流 产沙 减水减沙 神府东胜煤田

Abstract:

The processes of runoff and sediment yields from and the benefits of water and sediment reductions by the residues produced in the Shenfu-Dongsheng Coalfield were investigated by a simulated field rainfall experiment. The runoff generation time generally presented a decreasing trend with increasing rainfall intensity, but varied widely with the change of residue compositions. Runoff from the slag reached a steady velocity faster than that from the spoil, and the average velocities of runoff from the residues were gradually decreased in the spoil, the slag with more sand and less stone, and the slag with less sand and more stone. Runoff rates for the residues reached a steady rate 6 min after runoff generation, and were significantly correlated with the rainfall intensities. Erosion on the residues mainly occurred in the first 6 min after runoff generation. Average sediment concentrations in the first 6 min were 0.43-4.27 times of those thereafter for the spoil, and 1.43-54.93 times for the slag. The runoff volume was a linear function of the rainfall intensity for the spoil and the slag with more sand and less stone, and was a power function of rainfall intensity for the slag with less sand and more stone. The relationships between single erosion and rainfall intensity for the spoil and the slag with less sand and more stone can be described by exponential and power functions, respectively. For the spoil, the erosion rate was a linear function of the runoff volume. When fish scale pits and vegetation coverage were adopted on the surface of the slag, the generation of runoff lagged 24 min behind initial rainfall applications at intensities of 1.0 and 1.5 mm·min<sup>-1</sup>, and the runoff and sediment yields were reduced by 29.5%-52.9% and 85.7%-97.9%, respectively.

Key words: residues simulated field rainfall experiment runoff yield sediment yield water and sediment reductions Shenfu-Dongsheng Coalfield.

链接本文:

<http://www.cjae.net/CN/> 或 <http://www.cjae.net/CN/Y2013/V24/I12/3537>

没有本文参考文献

[1] 脱登峰<sup>1,2</sup>, 许明祥<sup>2,3\*\*</sup>, 郑世清<sup>3</sup>, 李强<sup>3</sup>. 黄土高原风蚀水蚀交错区侵蚀产沙过程及机理[J]. 应用生态学报, 2012, 23(12): 3281-3287.

服务

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ E-mail Alert
- ▶ RSS

作者相关文章

- ▶ 李建明<sup>1</sup>
- ▶ 王文龙<sup>1</sup>
- ▶ 2\*\*
- ▶ 王贞<sup>3</sup>
- ▶ 罗婷<sup>4</sup>
- ▶ 李宏伟<sup>5</sup>
- ▶ 金剑<sup>6</sup>

- [2] 王萍,王克勤,李太兴,李云蛟. 反坡水平阶对坡耕地径流和泥沙的调控作用[J]. 应用生态学报, 2011, 22(05): 1261-1267.
- [3] . 减轻二滩水库泥沙淤积的生态系统服务价值评估[J]. 应用生态学报, 2009, 20(09): 2225-2232.
- [4] 潘成忠, 上官周平. 黄土区次降雨条件下林地径流和侵蚀产沙形成机制——以人工油松林和次生山杨林为例[J]. 应用生态学报, 2005, 16(9): 1597-1602.
- [5] 张志强, 王盛萍, 孙阁, 张满良, 李建劳. 黄土高原吕二沟流域侵蚀产沙对土地利用变化的响应[J]. 应用生态学报, 2005, 16(9): 1607-1612.
- [6] 张晓明, 余新晓, 武思宏, 魏天兴, 张学培. 黄土区森林植被对坡面径流和侵蚀产沙的影响[J]. 应用生态学报, 2005, 16(9): 1613-1617.
- [7] 潘成忠<sup>1, 2, 3</sup>; 上官周平<sup>1</sup>. 黄土区次降雨条件下林地径流和侵蚀产沙形成机制[J]. 应用生态学报, 2005, 16(09): 1597-1602 .
- [8] 张志强<sup>1</sup> 王盛萍<sup>1</sup> 孙阁<sup>2</sup> 张满良<sup>3</sup> 李建劳<sup>3</sup>. 黄土高原吕二沟流域侵蚀产沙对土地利用变化的响应[J]. 应用生态学报, 2005, 16(09): 1607-1612 .
- [9] 张晓明 余新 武思宏 魏天兴 张学培. 黄土区森林植被对坡面径流和侵蚀产沙的影响[J]. 应用生态学报, 2005, 16(09): 1613-1617 .