

## 保护性耕作对农田地表径流与土壤水蚀影响的试验研究

### Experimental Study on Runoff and Erosion Under Conservative Tillage

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中文摘要:

在黄土坡地建立天然降雨径流小区,采用翻斗式自动测试系统同步动态地监测降雨—径流的过程,试验研究了保护性耕作农田水土保持的效果和耕作、覆盖及压实3种因素对农田水土流失的影响。2年的试验表明,雨强和雨型与坡地水土流失密切相关,在暴雨情况下,由秸秆覆盖与少免耕相结合的保护性耕作具有明显的保持水土作用;采用少免耕而无秸秆覆盖配合的情况下,水土流失甚至高于传统翻耕。在试验的6种处理中,免耕覆盖不压实的保水保土效果最佳,相对传统翻耕年径流量减少52.5%,年土壤流失量减少80.2%。在覆盖、压实及耕作3因素中,秸秆覆盖对保持水土的作用最大,可减少年径流量47.3%,减少年土壤水蚀77.6%;压实次之,地表耕作的影响较小。

英文摘要:

A field experiment was conducted on loess farmland in Northwest China to test different conservative tillage systems, and to compare them with conventional moldboard plough practice (CK) in terms of their effects on runoff and soil erosion. The effects of tillage, covering and compaction on runoff and erosion were also studied. Six treatments were laid out with tipping buckets and electronic data loggers that measured the rates of rainfall and runoff synchronously as a function of time. Total soil loss, divided into bed load and suspended load, was measured annually. Results of two years showed that slope runoff and erosion were highly dominated by rainfall pattern or rainfall intensity. Under heavy storms, conservative tillage, which features more residue cover and less soil disturbance, could remarkably reduce runoff and erosion compared to CK; while without residue cover, no tillage or minimum tillage could produce more runoff and erosion than CK. Among the six treatments No-tillage with residue Cover and No Compaction (NTCN) was the best one in terms of soil and water conservation. It was able to reduce runoff by 52.5% and erosion by 80.2% compared to CK. Residue cover is more efficient for soil and water conservation, which was able to reduce runoff by 47.3% and erosion by 7.6%. Compaction also had a considerable impact on runoff and erosion, while the effect of surface tillage was not so obvious since it reduced residue cover while loosening surface soil.

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