Soil and Water Conservation Effects of Different Tillage Measures on Mollisols Sloping Farmland in Northeast China

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Abstract

[Conventional tillage](https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/conventional-tillage) is still widely used in mollisols sloping farmland, which leads to serious [soil erosion](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/soil-erosion) . Effective farming methods have positive significance for alleviating soil erosion .To prevent and control soil and water loss in mollisols sloping farmland,field experiments were carried out in 2022 with three tillage methods and their combination modes(Subsoiling tillage (SF),Ridge tillage and pitting field (RF),Ridge tillage and pitting field + subsoiling tillage (RF-S),Contour tillage (TP),Contour tillage + ridge tillage and pitting field (TP-R),Contour tillage + subsoiling tillage (TP-S)) to evaluate the effects of soil and water conservation under different tillage methods. The results showed that the contour tillage + ridge field treatment significantly reduced surface runoff and soil loss ($P < 0.05$), and there was no nutrient loss. Compared with other treatments, this method significantly reduced runoff, erosion, and nutrient loss. The contour tillage + subsoiling tillage treatment significantly reduced the soil three-phase R value and improved the soil texture, and its yield, harvest index, and water use efficiency were higher than those of other treatments. Considered comprehensively, the results show that contour tillage + subsoiling tillage can reduce soil erosion and improve soil quality and water use efficiency while ensuring high production capacity. Furthermore, the results of this study provide a theoretical basis for conserving soil and water resources, improving soil fertility, and increasing farmland yield in the mollisols area of northeast China.

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