

## 长期施用化肥对黄土丘陵区坡地土壤物理性质的影响

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## Effects of long-term chemical fertilization on soil physical properties of slope lands in the Loess Hilly Region

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**摘要** 研究了17年长期定位施用化肥对黄土丘陵区坡耕地土壤物理性质的影响。结果表明: 长期施用化肥, 表层(0—15 cm)土壤物理性状没有明显退化, 中层(15—30 cm)和下层(30—45 cm)土壤物理性质有不同程度的改善; 长期施用化肥对水稳性团聚体影响大于土壤容重和孔隙度; 团聚体含量和稳定性在表层、中层和下层土壤中均得到不同程度地提高; 容重和孔隙度在表层和下层土壤中略有恶化, 在中层土壤上得到改善。长期不同水平化肥单施对土壤物理性状无显著影响, 而氮磷配施交互作用明显高于单施处理, 且施肥效果为氮磷配施>氮肥处理>磷肥处理。处理N2P1最有利于改善研究区土壤物理性状, 提高土壤的稳定性。

**关键词:** 黄土丘陵区 长期定位试验 化肥 坡耕地 土壤物理性质

**Abstract:** Based on 17 years field experiments, the effects of long-term located application of chemical fertilizer on soil physical properties were studied in cultivated slope lands in the hilly Loess Plateau of China. The results indicate that: under the condition of long-term chemical fertilization, soil physical properties in the surface layer (0—15 cm) do not show a trend of degradation, and those in the middle layer (15—30 cm) and lower layer (30—45 cm) are improved in different degrees. The influence of chemical fertilizer on soil water-stable aggregate is stronger than that on soil density or soil porosity. Soil aggregate content and aggregate stability are improved in all the three soil layers, while the soil density and soil porosity are slightly degraded in the surface and lower soil layer, but are improved in the middle layer. The long-term different levels of single-applying fertilization have no significant effect on the soil physical properties, however, the interaction of combined applying of nitrogen and phosphor is obviously higher than that of the single-applying. The rank of the effects of chemical fertilizer on soil physical properties under different fertilizer treatments is combined applying > single-nitrogen > single-phosphor. The N2P1 is the optimal fertilizer treatment in improving soil properties as well as sustaining soil stability in the research region.

**Keywords:** loess hilly region long-term field experiment chemical fertilizer slope cultivated land soil physical property

Received 2010-03-15;

Fund:

国家重点基础研究发展规划项目(2007CB407205); 中科院知识创新重要方向项目(KZCX2-YW-443); 中科院“西部之光”人才培养计划项目资助。

## 引用本文:

李强, 许明祥, 齐治军, 王恒威. 长期施用化肥对黄土丘陵区坡地土壤物理性质的影响[J] 植物营养与肥料学报, 2011, V17(1): 103-109

LI Qiang, Xu-Ming-Xiang, Qi-Zhi-Jun, Wang-Heng-Wei. Effects of long-term chemical fertilization on soil physical properties of slope lands in the Loess Hilly Region[J] Acta Metallurgica Sinica, 2011, V17(1): 103-109

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