

施肥和秸秆还田对土壤肥力质量及春小麦品质的影响

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Effects of chemical fertilizer and straw return on soil fertility and spring wheat quality

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摘要

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摘要 通过在青海省河湟灌区栗钙土上连续19年的春小麦连作长期定位试验, 研究了施用化肥与秸秆还田对土壤肥力质量及春小麦产量、品质的影响。结果表明, 在施氮、磷化肥的基础上增施钾肥和或秸秆还田可降低土壤容重1.2%~7.1%, 提高土壤含水量4.7%~13.5%, 增加土壤>0.25mm团聚体的数量, 促进团聚体的稳定性; 对土壤轻组有机质、有机质、土壤氮、磷、钾养分含量的提高也有明显的作用, 尤其是提高土壤速效钾含量最高达2.6倍; 对春小麦产量和品质也有一定的维持和促进作用。在施氮、磷的基础上增施适量无机钾肥或秸秆还田能够改善农田土壤肥力及质量状况, 稳定和增加春小麦产量和品质。考虑矿质钾肥成本较高和资源有效利用, 当地农业生产在氮、磷肥基础上半量秸秆还田可以替代无机钾肥。

关键词: 长期定位试验 秸秆还田 土壤质量

Abstract: A long-term field experiment was conducted for 19 years to investigate the effects of chemical fertilizer and wheat straw return on soil fertility and quality of grain under the condition of wheat-wheat continuous rotation on castanozems soil in Hehuang irrigation region of Qinghai province. The results show that compared with the control treatment, soil bulk densities and soil water contents are decreased by 1.2%–7.1% and 4.7%–13.5% under the N and P chemical fertilization combined with potash addition fertilization and/or straw return treatments, and the contents of soil water-stable aggregate (>0.25mm) are increased and stability of soil aggregate is improved. Regard to improving soil physical properties, the straw return is superior to the chemical N, P and K fertilization. The light fraction of soil organic matter, soil total organic matter, soil N, P and K contents are increased as well, especially soil available K content which reaches to 279.5mg/kg in the NPK+100%ST treatment and is about 2.6 times of the control treatment. The yield of spring wheat is also increased under the chemical N, P and K fertilization treatment combined with straw and chemical fertilizer. On base of the N and P fertilization, straw return and/or potash addition treatments except for the NPK+100%ST treatment improve protein content of wheat seed and have no negative effects on grain quality. Conclusions: suitable amounts of potash and/or straw application with chemical N and P fertilization can improve soil fertility and spring wheat yield and quality, and half amount of straw return can replace potash application in local agricultural practice.

Keywords: long term field test straw return soil quality

收稿日期 2011-06-27; 接受日期 2012-02-27

基金名称:

中国-加拿大IPNI项目

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引用本文:

张亚丽 吕家珑 金继运 李书田 陈占全 高旭升.施肥和秸秆还田对土壤肥力质量及春小麦品质的影响[J] 植物营养与肥料学报, 2012,18(2): 307-314

Ya-li ZHANG LU Jia-long JIN Ji-yun LI Shu-tian CHEN Zhan-quan GAO Xu-sheng. Effects of chemical fertilizer and straw return on soil fertility and spring wheat quality[J] Acta Metallurgica Sinica, 2012,18(2): 307-314

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