

微咸水灌溉对土壤盐分和作物产量影响研究

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Effects of irrigation with saline water on soil salinity and crop yield

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摘要 黄淮海平原部分地区分布着相当大面积矿化度在2~5g/L之间的浅层微咸水,有很大开发利用潜力。如何对其进行安全有效地开发利用是目前急需研究的重要课题。通过微区定位试验,研究了鲁西北低平原地区小麦玉米两熟制下微咸水灌溉对土壤盐分与作物产量的影响以及麦秸覆盖对微咸水灌溉土壤盐分的调控作用。结果表明,麦季利用3~5g/L矿化度的微咸水补充灌溉,两年后没有发生积盐现象,微咸水灌溉带入土体的盐分通过咸淡水轮灌和雨季自然淋洗,1m土体总盐量达到周年平衡。麦秸覆盖能够改善盐分在土体中的垂直分布,使土壤根系分布密集层保持较低盐分水平,缓解盐分对作物的危害,并有显著的增产效果。两年试验结果表明,与淡水灌溉比较,微咸水灌溉配合麦秸覆盖对作物年产量无显著差异,而不配以覆盖则导致减产。

关键词: 矿化度 咸水灌溉 麦秸覆盖 盐分 作物产量 矿化度 咸水灌溉 麦秸覆盖 盐分 作物产量

Abstract: As freshwater is increasingly becoming a short of resource, it is impending to seek other substitute water (resource) for agriculture. A kind of saline groundwater with degree of mineralization (DOM) at 2 g/L to 5 g/L in 10—20m underground layer was largely distributed at some of regions in Huang-huai-hai Plain, and these water were great (potential) resources for agricultural utilization. However, it is an urgent key research project to be studied how to use these saline water safely and effectively at present. The effects of saline water irrigation and combination with straw mulch on soil salinity and crop yield were studied at mini-plot under winter wheat-summer corn double cropping system in Northwestern Low Plain of Shandong Province. The results indicated that irrigation with DOM at 3g/L—5g/L saline water for two years in spring did not increased soil salinity. Salt from irrigated saline water could be leached by integrated fresh-saline water irrigation and rain, so that total salinity in 1 m soil layer could be balanced annually. Wheat straw mulch could improve soil salt vertical distribution in that salinity within 0—40cm soil layer maintained in a lower salt level which reduce (degree) of salt damage to crop, and in turn, crop yield could be increased significantly. Two years mini-plot experiment (results) showed that irrigation with saline water cooperated with straw mulch had no significant difference on whole year crop yield compared to irrigation with fresh water, but resulted in yield decrease without straw mulch.

Keywords:

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