

太湖水网地区不同种植类型农田氮素渗漏流失研究

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摘要: 为了探索太湖流域水网地区不同种植类型农田土壤中氮素累积量与渗漏水中氮素含量之间的关系, 在浙江省嘉兴市选择 10 个农田点位埋设渗漏计和地下水采集管, 采集水、土样品, 研究了菜地、果园和水田 3 种典型种植类型农田氮素渗漏流失情况。结果表明: 1) 旱作农田渗漏水中的 NO₃⁻-N 含量在汛期明显高于非汛期, 菜地在汛期和非汛期时 20 cm 渗漏水中的 NO₃⁻-N 含量分别为 51.70 mg·L⁻¹ 和 12.53 mg·L⁻¹, 果园在 20 cm 渗漏水中的 NO₃⁻-N 含量在 8 至 9 月份高达 125.51 mg·L⁻¹, 水田 20 cm 渗漏水中的 NO₃⁻-N 含量在汛期和非汛期差别不大, 分别为 2.17 mg·L⁻¹ 和 1.60 mg·L⁻¹。2) 研究区菜地和果园等高施肥量农田土壤中的无机氮含量和渗漏水中的氮素含量均显著高于水田。农田土壤中 NO₃⁻-N 累积量与渗漏水中氮素含量之间具有极显著的正相关关系, 表明农田土壤中高水平的 NO₃⁻-N 累积量必然增加氮素渗漏流失的风险。

关键词: 太湖流域; 氮素; 渗漏流失

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Study on nitrogen leaching in farmlands with different crops in
riverine plain area of Taihu Lake

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Abstract: In order to explore the relationship between the nitrogen (N) accumulation in soil and the N content in leaching water in farmlands with different crops in Taihu Lake Watershed, a series of field trials were carried out by fixing pumping water equipments on farms in Jiaxing, Zhejiang Province. 10 farmlands of 3 types were selected and water and soil samples were collected and analyzed. The results showed that NO₃⁻-N content in leaching water of vegetable fields and orchards in flood seasons was higher than that in non-flood seasons. The content of NO₃⁻-N in 20 cm leaching water was 51.70 mg·L⁻¹ and 12.53 mg·L⁻¹ in flood seasons and non-flood seasons respectively in vegetable fields. The content of NO₃⁻-N reached as high as 125.51 mg·L⁻¹ in August and September in 20 cm leaching water of orchards. The content of NO₃⁻-N in 20 cm leaching water was 2.17 mg·L⁻¹ and 1.60 mg·L⁻¹ in flood seasons and non-flood seasons respectively in Paddy plots. There was almost no difference in different seasons in Paddy plots. The N accumulation in soil layers and N content in leaching water of vegetable fields and orchards were much higher than that of Paddy plots. There was a significant positive relationship between NO₃⁻-N content in soil layers and N content in leaching water, which indicated that N accumulation in soil must cause N leaching loss and the more NO₃⁻-N accumulated in soil, the more N leached from the farmlands.

Key words: Taihu Lake Watershed; nitrogen (N); leaching loss

太湖流域农业面源污染已经十分严重, 导致湖泊富营养化, 土壤质量下降, 河流变黑发臭, 威胁该区域的整体环境质量和城乡居民的身体健康^[1]。浙江省嘉兴市地处太湖平原的水网地区, 该地区地势低平, 水网交错, 降雨频繁, 水旱轮作, 地下水位埋深较浅^[2], 通过对其浅层地下水水质的监测发现