

研究论文

洞庭湖区不同利用方式对土壤微生物生物量碳氮磷的影响

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摘要 以湖南省沅江市典型湖垌为代表, 通过密集取样分析, 研究了洞庭湖区不同利用方式条件下农田土壤微生物生物量碳、氮、磷的变化及其和土壤碳、氮、磷的关系, 发现水田土壤碳、氮和微生物生物量碳、氮明显高于旱地, 水田土壤中双季稻高于一季稻; 土壤磷的含量旱地稍高于水田, 但土壤微生物生物量磷水田稍高于旱地。尽管在水田土壤中微生物生物量碳、氮有明显的不同, 但水田土壤微生物生物量磷维持在相对稳定的水平。典型样区土壤微生物生物量碳占有有机碳的比例为0.65%~7.24%, 平均3.00%; 土壤微生物生物量氮占全氮的比例为0.98%~7.41%, 平均3.81%; 土壤微生物生物量磷占全磷的比例为0.16%~7.54%, 平均2.80%。土壤C/N为3.87~17.31, 平均9.15; BC/BN为4.06~9.29, 平均7.26。土壤微生物生物量碳、氮与土壤碳、氮之间存在极其显著的线性相关关系, 但土壤微生物生物量磷占全磷之间相关关系不显著。土壤微生物生物量碳、氮、磷之间的相关关系达到了极显著水平。不同的利用方式和耕作制度导致了土壤碳、氮和微生物生物量碳、氮的差异, 土壤微生物生物量碳、氮能够很好地反映洞庭湖区农田土壤碳、氮水平。

关键词 [土壤碳、氮、磷](#); [微生物生物量碳、氮、磷](#); [洞庭湖区](#); [土地利用方式](#); [耕作制度](#)

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Microbial biomass C,N,P of farmland soils in different land uses and cropping systems in Dongting Lake region

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Abstract In the aim of understanding the characteristics of the microbial biomass in the farming soil derived from wetlands, detail field investigations were conducted in a selected landscape unit (112°16'~112°56'E, 28°42'~29°11'N) in the Dongting Lake region of Hunan Province. Data suggest that paddy soils contained larger amounts of total organic C (TOC), total N (TN), and the microbial biomass C and N (BC and BN) than arable soils in this region. For paddy soils, the contents of TOC and TN were larger under double-rice cropping systems than under single rice cropping systems. However, the content of total P (TP) for soils was under slightly larger in arable soils but the content of microbial biomass P (BP) was slightly larger in paddy soils than in arable soils. It is surprising that, despite of the difference in the contents of TOC and TN resulted from double and single rice cropping systems, the content of BP maintained relatively consistent for all the paddy soils. BC, BN, and BP as the percentage of TOC, TN, and TP in the soils of this region varied from 0.65% to 7.24% (a mean of 3.00%), 0.98% to 7.41% (a mean of 3.81%), and 0.16%-7.54% (a mean of 2.80%), respectively. The ratio of BC to BN varied from 4.06 to 9.29 (a mean of 7.26). The contents of BC and BN significantly correlated to those of SOC and TN ($p < 0.01$), but not so between the contents of BP and TP. Significant correlations also existed the contents of BC, BN, and BP. This study suggests that land-uses and cropping systems resulted in significant differences in the contents of TOC and TN in soils in wetland regions, and the

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t the contents of BC and BN can sensitively reflect changes in TOC and TN.

Key words soil C, N, P; soil microbial biomass C, N, P Dongting Lake
region land uses cropping systems

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