

研究报告

施肥对雷竹林土壤活性有机碳的影响

姜培坤; 徐秋芳

浙江林学院生态环境研究所, 临安 311300

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摘要

采用重施肥料试验研究了不同重施肥习惯对雷竹林土壤碳库产生的影响, 结果表明, 各有机肥、化肥混合处理土壤总有机碳 (TOC)、水溶性碳 (WSOC)、微生物量碳 (MBC)、矿化态碳 (MC) 及 WSOC/TOC、MBC/TOC 和 MC/TOC 均显著或极显著高于单施化肥各处理. 3 个有机肥、化肥混施处理中, 随着有机肥用量减少, TOC、WSOC、MBC 和 MBC/TOC 显著下降, 有机肥用量减少一半, 上述各类碳分别下降 10.75%、12.02%、30.94% 和 22.61%. 单施化肥处理中, 氮素用量超过 $1009.5 \text{ kg}\cdot\text{hm}^{-2}\cdot\text{年}^{-1}$ 会使土壤 WSOC、MBC、MBC/TOC 明显降低. 雷竹土壤 TOC、WSOC、MBC 和 MC 两两之间相关性均达显著或极显著水平, 进一步通过 6 个处理变异系数分析发现, 土壤 MBC、MBC/TOC 是衡量雷竹土壤碳库质量的最佳指标.

关键词 [雷竹](#); [土壤](#); [施肥](#); [有机碳](#)

分类号

Effects of fertilization on soil active organic carbon under *Phyllostachys praecox* stand

JIANG Peikun, XU Qiufang

Institute of Eco-Environment, Zhejiang Forestry College, Lin'an 311300, China

Abstract

In this paper, fertilization experiment was conducted on *Phyllostachys praecox* stand to study the effects of different heavy application of chemical fertilizers and manure on soil active organic carbon pool. The results showed that compared with only applying chemical fertilizers, the combined application of chemical fertilizers and manure significantly increased the contents of soil total organic carbon (TOC), water soluble organic carbon (WSOC), microbial biomass carbon (MBC) and mineralized carbon (MC) as well as the ratios of WSOC/TOC, MGC/TOC and MC/TOC ($P < 0.01$ or $P < 0.05$). With the decreasing application rate of manure, soil TOC, WSOC, MBC and MBC/TOC decreased significantly ($P < 0.05$), and when the application rate of manure was decreased by 50%, soil TOC, WSOC, MBC and MBC/TOC decreased by 10.75%, 12.02%, 30.94% and 22.61%, respectively. In the treatments of only applying chemical fertilizers, soil WSOC, MBC and MBC/TOC decreased obviously when the application rate of fertilizer nitrogen exceeded $1009.5 \text{ kg}\cdot\text{hm}^{-2}\cdot\text{yr}^{-1}$. There were significant correlations between soil TOC, WSOC, MBC and MC ($P < 0.01$ or $P < 0.05$), among which, MBC and MBC/TOC could be used as the quality indications of soil carbon pool under *Phyllostachys praecox* stand.

Key words [Phyllostachys praecox](#) [Soil](#) [Fertilization](#) [Organic carbon](#)

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