应用生态学报 2015年9月 第26卷 第9期
Chinese Journal of Applied Ecology, Sep. 2015, 26(9): 2639-2645

不同植被类型下红壤 pH 和交换性酸的剖面特征*

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摘 要 研究湘南红壤丘陵区11种植被类型下施肥区域和未施肥区域红壤剖面(0~100 cm) pH及交换性酸的变化特征.结果表明: 施肥区域0~60 cm土层土壤的pH大小顺序为茶园<花生地<柑橘园,交换性酸含量大小为花生地≤柑橘园<茶园; 种植茶树和花生后,表层(0~40 cm)相对底层(60~100 cm)均产生酸化,pH分别降低0.55和0.17,而种植柑橘后,土层间无显著差异.未施肥区域中,植被恢复区0~40 cm土层pH大小为白櫟木林≤湿地松林<板栗园<白茅草地,交换性酸含量大小为白茅草地<板栗园<白櫟木林≤湿地松林; 天然林区0~20 cm土层中次生林和油茶林的pH均显著低于马尾松林0.34和0.20个单位,马尾松林和次生林交换性酸含量显著低于油茶林.与裸地相比,未施肥区域除白茅草地外,其他植被类型均加速了表层土壤酸化,其中天然次生林酸化最严重,pH降低0.52; 未施肥区域除天然次生林外,其他植被类型均提高了深层土壤pH,其中白茅草地提升效果最显著,pH升高0.43.无论施肥区域还是未施肥区域,整体上随着土层深度的增加,植被类型或施肥对土壤酸度的影响越来越小.

关键词 红壤; 植被类型; pH; 交换性酸; 剖面特征
文章编号 1001-9332(2015)09-2639-07 **中图分类号** S156.6; X171.1 **文献标识码** A

Characteristics of soil pH and exchangeable acidity in red soil profile under different vegetation types. JI Gang[1], XU Ming-gang[1], WEN Shi-lin[1,2], WANG Bo-ren[1,2], ZHANG Lu[1,2], LIU Li-sheng[1,2] ([1]*Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences/Ministry of Agriculture Key Laboratory of Crop Nutrition and Fertilization, Beijing* 100081, *China*; [2]*Red Soil Experimental Station, Chinese Academy of Agricultural Sciences/National Observation and Research Station of Farmland Ecosystem in Qiyang, Qiyang* 426182, *Hunan, China*). *Chin. J. Appl. Ecol.*, 2015, **26**(9): 2639-2645.

Abstract: The characteristics of soil pH and exchangeable acidity in soil profile under different vegetation types were studied in hilly red soil regions of southern Hunan Province, China. The soil samples from red soil profiles within 0-100 cm depth at fertilized plots and unfertilized plots were collected and analyzed to understand the profile distribution of soil pH and exchangeable acidity. The results showed that, pH in 0-60 cm soil from the fertilized plots decreased as the following sequence: citrus orchard > *Arachis hypogaea* field > tea garden. As for exchangeable acidity content, the sequence was *A. hypogaea* field ≤ citrus orchard < tea garden. After tea tree and *A. hypogaea* were planted for long time, acidification occurred in surface soil (0-40 cm), compared with the deep soil (60-100 cm), and soil pH decreased by 0.55 and 0.17 respectively, but such changes did not occur in citrus orchard. Soil pH in 0-40 cm soil from the natural recovery vegetation unfertilized plots decreased as the following sequence: *Imperata cylindrica* land > *Castanea mollissima* garden > *Pinus elliottii* forest ≥ *Loropetalum chinensis* forest. As for exchangeable acidity content, the sequence was *I. cylindrica* land < *C. mollissima* garden < *L. chinensis* forest ≤ *P. elliottii* forest. Soil pH in surface soil (0-20 cm) from natural forest plots, secondary forest and *Camellia oleifera* forest were significantly lower than that from *P. massoniana* forest, decreased by 0.34 and 0.20 respectively. For exchangeable acidity content in 0-20 cm soil from natural forest plot, *P. massoniana* forest

* 国家重点基础研究发展计划项目(2014CB441001)资助.
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2014-12-08 收稿,2015-05-07 接受.