

川中丘陵区边坡防护林对农田土壤有机碳的影响——以盐亭县为例

李亚琴,李梁,黄蓉,张益凡,何海洋,杨占彪

四川农业大学资源环境学院

Effect of Shelterbelt on Soil Organic Carbon in Farmland in Hilly Area of Central Sichuan Basin:A Case Study of Yanting

LI Ya-Qin, LI Liang, HUANG Rong, ZHANG Yi-Fan, HE Hai-Yang, YANG Zhan-Biao

College of Resource and Environment, Sichuan Agricultural University

摘要

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摘要 通过边坡防护林和轮作措施的区组对比分析,研究川中丘陵区典型的边坡防护林——柏木林对农田土壤有机碳和微生物量碳含量分布的影响。结果表明,有边坡防护林的2种农田(油菜-玉米轮作和玉米单作)土壤有机碳和微生物量碳含量明显高于无防护林同类农田。有防护林的农田土壤有机碳和微生物量碳含量呈与防护林距离减小而下降的变化趋势;而无防护林农田内,不同距离土壤有机碳和微生物量碳含量无显著差异。多因素方差分析表明,防护林对土壤有机碳和微生物量碳含量的影响均达显著水平,轮作措施仅对浅层土壤微生物量碳含量的影响达显著水平。总体上看,柏木防护林能增加农田土壤有机碳含量,但同时近距离农作物存在一定的胁迫作用,应该对纯柏木防护林的结构和组成进行改造。

关键词: 川中丘陵区 防护林 土壤有机碳 土壤微生物量碳 轮作

Abstract: Farmland shelterbelt has an important ecological effect on agroecosystem. A comparative analysis was conducted of soil organic carbon(SOC) and soil microbial biomass carbon(C_{mic}) in field with shelterbelt and fields under crop rotation in the hilly region of central Sichuan basin, to study effects of cypress shelterbelt on two parameters. Results show that SOC and C_{mic} contents in the farmlands (under rapeseed-maize rotation and monocropping of maize) with shelterbelt were significantly higher than that in the farmlands without shelterbelt, and declined with the increasing distance from the shelterbelt. However, in the fields without shelterbelt, the distribution of SOC and C_{mic} did not vary much. According to the multifactor variance analysis, shelterbelt had significant effects on both SOC and C_{mic} , while crop rotation had such effect only on soil C_{mic} in the shallow soil layer. The experiment showed that on the whole the cypress shelterbelt can improve SOC content in the farmland, but it does somewhat affect growth of the crop in its vicinity. It is, therefore, advisable to alter the composition or restructure the pure cypress shelterbelt.

Keywords: hilly area of central Sichuan basin shelterbelt soil organic carbon soil microbial biomass carbon crop rotation

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Corresponding Authors: 杨占彪 四川农业大学资源环境学院 Email: yzb195@126.com

About author: 李亚琴(1990—),女,四川成都人,本科,主要从事生态学研究。E-mail: 994507287@qq.com

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