

## 研究报告

# 杉木人工林取代天然次生阔叶林对土壤生物活性的影响

胡亚林<sup>1, 2</sup> 汪思龙<sup>1</sup> 颜绍<sup>1</sup> 高洪<sup>1</sup>

廋<sup>1</sup> 高洪<sup>1</sup>

<sup>1</sup>中国科学院沈阳应用生态研究所会同森林生态实验站, 沈阳 110016; <sup>2</sup>中国科学院研究生院, 北京 100039

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## 摘要

对我国亚热带南、中、北3个区带杉木人工林与天然次生阔叶林表层土壤化学性状、土壤生物活性特征进行研究。结果表明, 杉木人工林取代天然次生林阔叶林后表层土壤总有机碳含量下降31.51%~58.24%, 土壤全氮、全磷、pH值以及土壤C/N、C/P比亦呈下降趋势; 杉木人工林取代天然次生阔叶林后表层土壤细菌、真菌数量减少; 土壤脲酶、蔗糖酶、过氧化氢酶和脱氢酶活性下降, 而土壤多酚氧化酶活性增加8%~40%; 杉木人工林与天然次生林阔叶林相比, 土壤呼吸强度下降51.15%~54.48%。相关分析发现, 土壤总有机碳与土壤多酚氧化酶活性呈负相关( $R=-0.723$ ,  $n=18$ ), 与土壤全氮、全磷及其它土壤酶活性呈正相关。杉木人工林取代天然次生林阔叶林使林内表层土壤质量恶化。杉木人工林土壤有机质丢失是导致杉木人工林土壤养分减少、土壤生物活性下降的重要原因。

关键词 [杉木人工林, 天然次生林, 土壤生物活性](#)

分类号

## Effects of replacing natural secondary broad-leaved forest with unninghamia lanceolata plantation on soil biological activities

HU Yalin<sup>1, 2</sup>, WANG Silong<sup>1</sup>, YAN Shaokui<sup>1</sup>, GAO Hong<sup>1</sup>

<sup>1</sup>Huitong Experimental station of Forest Ecology, Institute of Applied Ecology, Chinese Academy of Sciences, Shenyang 110016, China; <sup>2</sup>Graduate School of Chinese Academy of Sciences, Beijing 100039, China

## Abstract

This paper studied the effects of replacing natural secondary broad-leaved forest with Cunninghamia lanceolata plantation in the south, central and upstate areas of subtropical China on the changes of soil chemical and biological properties. The results showed that after replacing with Cunninghamia lanceolata plantation, the total organic carbon (TOC) content in surface soil decreased by 31.51%~58.24%, and the contents of soil total N and P, pH value, C/N and C/P also decreased to different degree. Soil microbial amount was less than that under natural secondary broad-leaved forest, soil urease, invertase, catalase and dehydrogenase activities decreased, while soil polyphenol oxidase activity increased by 8%~40%. The respiration rate of Cunninghamia lanceolata soil was 51.15%~54.48% lower than that of natural secondary broad-leaved forest soil. The correlation between soil TOC and polyphenol oxidase activity was negative ( $R=-0.723$ ,  $n=18$ ), while those between soil TOC, N, P and other enzyme activities were positive. It could be concluded that replacing natural secondary broad-leaved forest with Cunninghamia lanceolata plantation worsened soil quality, and the loss of soil organic matter in Cunninghamia lanceolata plantation ecosystem might be one of the important factors resulted in the decrease of soil nutrients and enzyme activities.

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