

研究论文

四川都江堰地区桉楠林、杉木林和常绿阔叶林土壤N库的季节变化

蔡春轶, 黄建辉*

中国科学院植物研究所植被数量生态学重点实验室, 北京100093

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摘要 通过对四川都江堰地区桉楠 (*Phoebe zhennan*) 林、杉木 (*Cunninghamia lanceolata* (Lamb.)) 林以及常绿阔叶林为期1a的研究, 比较不同森林群落类型中N库各组分的大小以及季节动态, 同时研究不同群落类型中N库各组分之间的关系, 探讨植被、土壤特性以及微生物对N转化的影响。结果表明: ①3种群落类型中土壤 NH_4^+ -N含量有明显的季节变化, 均在冬季(12月份)达到最大。随着植物的生长, NH_4^+ -N含量逐渐下降; ②3种类型的群落土壤中 NO_3^- -N含量的平均值差别很大, 同一个森林群落类型在不同季节 NO_3^- -N含量有明显的季节变化, 但并不是所有的季节之间都存在显著差异; ③3种森林群落类型在采样期内的土壤平均全N含量存在显著差别, 在不同季节, 土壤全N含量变化并不大; ④微生物量N在采样期内的波动很大, 就每个样地来说也具有一定的规律。得出的结论认为: 不同的森林群落类型中的N循环同该群落内的土壤和植被类型有密切的联系, 土壤微生物量N同环境因素(土壤温度和湿度)的关系存在时空变化。

关键词 桉楠林; 杉木林; 常绿阔叶林; N库组分; 土壤微生物; 动态

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Seasonal dynamics of soil N pools under *Phoebe zhennan*, *Cunninghamia lanceolata* (Lamb.) and evergreen broad-leaved forests in Dujiangyan Region, Sichuan, China

CAI Chun-Yi, HUANG Jian-Hui *

Laboratory of Quantitative Vegetation Ecology, Institute of Botany, Chinese Academy of Sciences, Beijing 100093, China

Abstract This study was conducted in a deciduous broad-leaved *Phoebe* forest, a conifer *Cunninghamia* forest, and a mixed evergreen broadleaf forest in Dujiangyan Region, Sichuan, China. Our objectives were: (1) to compare the pool sizes of different soil N components and their seasonal variations in the three forest types; (2) to explore the relationship between the different N pools in these forests, and (3) to examine how N transformations were linked to vegetation, soil properties, and microorganisms. The results showed that there was obvious seasonal dynamics in soil ammonia concentration in all the three forest types with the maximum values occurring in winter (December). Soil ammonia concentration decreased gradually during the growing season. We observed that the soil nitrate concentration varied greatly with seasons, but it followed different temporal patterns with the soil ammonium concentration. There were significant differences in soil nitrate concentration among the three forest types. Significant differences in soil total nitrogen existed among the three forest types with the highest value in the conifer forest and the lowest in the *Phoebe* forest. Substantial seasonal variations of soil microbial biomass nitrogen were also observed. Soil temperature and moisture contributed to the temporal and spatial variations of soil microbial biomass N. Our results suggest that N transformations were related closely to soil properties and vegetation types.

Key words [Phoebe zhennan forest](#) _ [Cunninghamia lanceolata](#) (Lamb.) forest _ [Evergreen broad-leaved forest](#) _ [N component pool](#) _ [soil microorganisms](#) _ [dyn](#)

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通讯作者 黄建辉 jhuang@ibcas.ac.cn