

研究报告

缙云山森林群落次生演替中土壤理化性质的动态变化

刘鸿雁<sup>1, 2</sup>, 黄建国<sup>1</sup>

<sup>1</sup>西南农业大学资源与环境学院,重庆 400716;<sup>2</sup>贵州大学资源与环境学院,贵阳 550025

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摘要

选择典型、有代表性的不同演替阶段群落,进行了植被调查和土壤分析.结果表明,土壤理化性质在演替方向和土壤剖面上表现出较强的规律.土壤有机质随植被从低级向高级演进逐渐积累,分别是19.5 (X1)、37.0(X2)、50.1 (X3)和71.6 g·kg<sup>-1</sup>(X4);土壤全N、碱解氮和速效钾等也呈上升趋势;土壤pH和盐基饱和度降低,阳离子交换量增加.在土壤剖面上,有机质、全N等指标表现出A>B>C层的趋势.灰色关联度分析表明,随着演替的进行,土壤肥力提高,物种丰富度和郁闭度也相应增加.不同群落土壤理化性质在不同季节有显著差异,但这种差异并不影响植物与土壤在大时间尺度下的演变方向.土壤理化性质的动态变化与植物演替相适应.

关键词 [森林群落,次生演替,人类活动干扰,土壤理化性质](#)

分类号

Dynamics of soil properties under secondary succession forest communities in Mt.Jinyun

LIU Hongyan <sup>1,2</sup>,HUANG Jianguo <sup>1</sup>

<sup>1</sup>College of Natural Resource and Environment Science,Southwest Agricultural University,Chongqing 400716,China;<sup>2</sup>College of Resource and Environment Science,Guizhou University,Guiyang 550025,China

Abstract

Mt.Jinyun is located in the north suburb of Chongqing,30 km away from the city center.It is rich in forest plants,an epitome of forests in north tropical areas of China.Under anthropocentric disturbance,there still exist large numbers of succession communities,and the process of successive development follows the way of shrub-grassland(X1)→coniferous forest (X2)→coniferous?broad leaved mixed forest(X3)→evergreen broad?leaved forest(X4).By now,soil and water conservation is very important in the Three Gorges area of Yangtze River,and the investigation on the secondary succession of the forests could help to realize the changes of the forests and soils under anthropocentric disturbance,and supply information on the protection of natural forests and the artificial reforestation of this area.In this paper,some typical and representative plant communities in different succession stages were selected to study the plant composition and type and the soil properties,with species diversity indices and canopy density investigated in many standard squares and soil physical and chemical characteristics analyzed.The results showed that there were obvious variations of soil properties with time.As the plant community developed from primary stage to climax,the contents of soil organic matter,total N,and available N and K increased in order of X1<X2<X3<X4,soil pH changed from 5.23(X1)to 4.06(X4),soil base saturation varied from 58.3%(X1)to 37.7%(X4),and soil CEC increased with the succession.It was suggested that an intense soil acid leaching was occurred in Mt.Jinyun.The contents of soil organic matter and total N in different layers showed a trend of A>B>C,e.g.,soil total nitrogen in evergreen broad leaved forest was 2.31(A),0.66(B)and 0.12(C)g·kg<sup>-1</sup>.Gray analysis was used to study

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the relationships of soil properties between the climax community and other three succession communities. The relation coefficient was 0.4610(X3), 0.5862(X2) and 0.6821 (X1), respectively, indicating that soil nutrients were accumulated as the forest succession community progressed. The plant arbor species followed the sequence of 0(X1) < 7.5(X2) < 9.0 (X3) < 12.8(X4), and the canopy density ranked as the same way. Plant community could affect soil nutrient reserves significantly. Multivariate variance analysis showed that soil properties varied significantly among different seasons, but this variation had no impact on the community replacement and soil development during the hronosequence of community succession. The variation of soil properties adapted well to each successive community.

**Key words** [Forest community](#) [Secondary succession](#) [Anthropocentric disturbance](#)  
[Soil property](#)

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