

研究报告

岷江上游不同植被下土壤团聚体特征分析

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摘要

以岷江上游卧龙自然保护区内不同植被条件下土壤为对象, 研究了暗针叶林、针阔混交林、暗针叶林林窗下箭竹林、高山栎4种植被土壤的团聚体数量特征. 结果表明, 湿筛法得到的4种植被类型土壤团聚体服从对数正态分布, 其几何平均直径与标准差之间存在负相关关系. 其中, 针阔混交林和高山栎林土壤具有较大的团聚体直径. 土壤的分形维数范围在2.40~2.78之间, <0.25 mm团聚体含量越高, 土壤团聚体分形维数越大, 暗针叶林土壤的第2层和暗针叶林窗箭竹林土壤的第3层的分形维数最大. 土壤团聚体的保存机率以3~1 mm、1~0.5 mm粒径级团聚体为大, 遭到破坏的可能性小; >10 mm、0.5~0.25 mm粒径级的团聚体的保存机率小, 容易遭到破坏. 对团聚体稳定性指数进行剖面加权平均发现, 针阔混交林土壤的稳定性指数最高, 其次为高山栎林土壤、暗针叶林窗下箭竹林和暗针叶林土壤, 说明针阔混交林和高山栎林有利于土壤团聚体的稳定. 团聚体的3个数量特征之间具有密切联系, 均可用于说明土壤团聚体稳定性的大小.

关键词 [植被, 土壤团聚体, 对数正态分布, 分形维数, 团聚体稳定性指数](#)

分类号

Quantitative characteristics of soil aggregates under different vegetations in upper reach of Minjiang River

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Abstract

Quantitative analysis on the soil aggregates under dark coniferous forest, coniferous and broad-leaved mixed forest, fargesia under the gap of dark coniferous forest, and sclerophyllous oaks (*Quercus semicarpifolia*) at Wolong Natural Reserve in the upper reach of Minjiang River showed that wet-sieving soil aggregates were of logarithmic-normal distribution, and the geometric mean diameters were negatively correlated to geometric standard deviation. The aggregates under coniferous and broad-leaved mixed forest and sclerophyllous oaks had larger sizes than those under other vegetations. The range of fractal dimension of soil aggregates was 2.40~2.78, along with more aggregates less than 0.25 mm in size. The fractal dimension of soil aggregates under dark coniferous forest and fargesia were larger than that under other vegetations. The soil aggregates with 3~1 mm and 1~0.5 mm in size had a higher stability, while those with >10 mm and 0.5~0.25 mm in size were in adverse. The aggregate stability index of soil under coniferous and broad-leaved mixed forest was the

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highest, followed by that under sclerophyllous oaks, fargesia under the gap of dark coniferous forest, and dark coniferous forest, which meant that coniferous and broadleaf mixed forest and sclerophyllous oaks were favorable for soil aggregate stability. Significant correlations were found among the three quantitative characteristics, which could be used to indicate the stability of soil aggregates.

Key words [Vegetation](#) [Soil aggregate](#) [Logarithmic normal distribution](#) [Fractal dimension](#) [Soil aggregate stability index](#)

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