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岩石边坡植被建植初期植被特征与土壤养分动态

Characteristics and soil nutrient dynamics in beginning period of artificial vegetation on rock slope

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作者	单位
王志泰	1. 甘肃农业大学林学院, 兰州 730070; 2. 贵州大学林学院, 贵阳 550025
李毅	1. 甘肃农业大学林学院, 兰州 730070
王志杰	3. 中国科学院水利部水土保持研究所, 杨凌 712100

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中文摘要:

为了解边坡生态防护工程植被建植初期植物特征与基质养分变化规律, 依托实际工程, 采用定位研究法, 对3个不同坡向、坡度的边坡在人工植被建植后第1周年主要群落特征(物种、盖度和高度等)和土壤养分因子(如有机质和速效态养分元素)等每月进行跟踪测试。结果表明: 1) 边坡人工植被建植1周年内, 植物植被的数量特征总体上存在明显的季节性变化, 物种数在建植初期较多, 在冬、春季物种数最低, 第2年返青后逐渐增加。3个边坡存活部分盖度在冬春季平均盖度最低, 到5月份随气温回升而突增, 经建植周年后, 平均盖度基本相同, 在60%左右, 群落存活部分平均高度的时间变异特征符合3次幂函数。2) 3个边坡土壤速效态养分与有机质总体上在周年内有较为一致的变化趋势, 但相互之间存在明显的差异, 周年期末碱解氮和有效磷含量与建植初期相比有所下降, 速效钾与有机质含量均高于建植初期。3) 通过多元逐步回归分析, 除有机质与植被群落数量特征无线性回归关系外, 其余速效态的土壤元素均有一定的多元线性关系, 然而边坡之间的同一土壤养分因子与植被群落特征相关指标之间的相关性差别较大, 无法形成统一的解释方程, 还需后续研究中综合考虑多种影响因素及其之间的交互关系。

英文摘要:

In order to understand the vegetation characteristics and nutrient variation in the beginning period of ecological protection engineering on the rock slope, taking an actual project as study case, the location study method was adopted to investigate the main community characteristics such as species composition, coverage and height, and soil nutrient factors such as organic matter and available nutrient elements on three slopes with different aspect and gradient in the first year after vegetation planted. Results showed that: 1) During the first year since artificial vegetation planted, there was significant seasonal changes on quantitative characteristics of plant communities. The number of species was more in the beginning period, then reached the minimum in the winter and spring, while gradually increasing after returning green in the second year. On the three slopes, the average coverage of live parts declined to the minimum in the winter and spring, and increased suddenly with the temperature increasing in May. After a year of planting, the average coverage was similar to each other with a value of about 60%. The average height of live parts of the vegetation changed with time and the variation was accorded to cubic power function. 2) The changing tendency of soil available nutrients and organic matter were similar in the three slopes during the first year. But there were obvious differences between each other. Content of available nitrogen and phosphorus decreased in the end of year, but the available nitrogen and organic matter increased. 3) By the multiple stepwise regression analysis, excluding organic matters of three slopes, other soil available elements showed multiple linear relationship with vegetation community characteristics. While the same soil nutrient factor and the matched indicator of vegetation community characteristics varied greatly among different slopes and they could not form a unified equation of interpretation. So more influence factors and interactive relationships should be considered synthetically in the follow-up studies.

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