

黑木相思家系适地适树品种综合评价

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[目的]杉木、桉树人工林高度集约经营和连栽代次的递增导致人工林出现土壤养分周转能力下降等问题, 土壤肥力质量逐代降低已成为人工林可持续经营的主要障碍。为选出适宜南方山地此土壤条件下适应性和改土效果优良的黑木相思家系。揭示黑木相思土壤养分的空间分异规律与地形变化的关系。[方法]本文以福清灵石山场杉木采伐迹地上营造的 15 年生 7 个黑木相思家系 (M1~M7) 为研究对象, 采用经典统计学、描述性统计、地统计学方法和 GIS 技术, 通过对林木生长特性、土壤物理结构和养分特征在不同坡位上的研究, 分析了不同家系的土壤理化性质的变化规律和土壤养分的空间分布, 并通过因子分析法和模糊评价法对 7 个黑木相思家系进行综合评价选优。[结果]7 个黑木相思家系的理化性质在不同坡位的含量大多表现为下坡位>中坡位>上坡位, 下坡位显著高于其他坡位; 家系间土壤结构和养分含量均表现出 M7、M6 和 M5 较好; 研究区各养分含量总体呈块状或条带状分布, 呈现从东北和西北方向往南方向递增的趋势。[结论]综合评价在上下坡位黑木相思家系 M7 值最高, 其生长对土壤理化性质的改良效果最佳, 在中坡位黑木相思家系 M6 最佳。研究结果基于适地适品种的用地优化布局理念筛选出在南方山地适宜种植的黑木相思家系, 为林分的精准提升提供理论技术支持。

关键词: 黑木相思家系; 林木生长; 土壤理化性质; 空间异质性; 综合评价

Comprehensive Evaluation of Suitable Land and Tree Varieties of *Acacia melanoxylon* Family

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[Objective] The highly intensive management of fir and eucalyptus plantations and the increment of successive generations have led to the problems of decreasing soil nutrient turnover capacity in plantations, and the decrease of soil fertility quality from generation to generation has become a major obstacle to sustainable management of plantations. In order to select *Acacia nigra* family with excellent adaptability and soil modification effect suitable for this soil condition in southern mountains. To reveal the relationship between the spatial differentiation pattern of soil nutrients of *Acacia nigra* and topographic changes. [Methods] In this paper, seven 15-year-old *Acacia nigra* lineages (M1~M7) created on fir harvesting sites in Fuching Lingshi Mountain Field were used as the research objects, and classical statistics, descriptive statistics, geostatistical methods and GIS techniques were used to analyze the variation patterns of soil physical and chemical properties and soil nutrients of different lineages through the study of forest growth characteristics, soil physical structure and nutrient characteristics on different slopes. The spatial distribution of soil nutrients was analyzed, and the seven *Acacia nigra* lines were evaluated by factor analysis and fuzzy evaluation method. [Results] The physical and chemical properties of the seven *Acacia nigra* lineages in different slopes mostly showed that the lower slope > middle slope > upper slope, and the lower slope was significantly higher than the other slopes; the soil structure and nutrient contents among the lineages showed that M7, M6 and M5 were better; the nutrient contents in the study area were generally distributed in blocks or strips, showing an increasing trend from northeast and northwest to south. [Conclusion] The comprehensive evaluation

value was highest in the upper and lower slope of *Acacia nigra* family M7, and its growth had the best effect on the improvement of soil physical and chemical properties, and in the middle slope of *Acacia nigra* family M6. The results of the study were based on the concept of land-optimized layout of suitable species to screen out the suitable *Acacia nigra* lines for planting in southern mountainous areas, and provide theoretical technical support for the precise upgrading of forest stands.

Keywords: *Acacia melanoxyton* family; forest growth; soil physicochemical properties; spatial heterogeneity; comprehensive evaluation