

研究报告

火力楠、荷木和黎蒴林的土壤特性及涵养水源的研究

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摘要

对火力楠、荷木和黎蒴纯林的土壤物理性质、林地持水特性、土壤养分、微生物数量及酶活性进行了研究. 结果表明, 3种林地的土壤容重分别为1.19、1.26和1.06 g·cm⁻³, 总孔隙分别为56.73%、54.18%和60.74%, 土壤自然含水量分别为15.7%、13.0%和19.4%, 毛管持水量分别为43.2%、37.8%和45.8%. 火力楠林地的土壤保水性一般而通气性差; 荷木林地的土壤保水性和通气性均差, 黎蒴林地的土壤保水性和通气性好. 火力楠、荷木和黎蒴单株凋落物持水量分别为20、8和15 kg, 林地分别为16、13和17 t·hm⁻²; 火力楠、荷木和黎蒴单株凋落物养分储量分别为112.71、31.20和87.30 g, 林地分别为84.35、51.86和98.11 kg·hm⁻². 3种林地呈强酸性. 黎蒴林地的土壤有机质、全N、全P、全K、碱解N和速效P含量最高, 而速效K含量为荷木林地>黎蒴林地>火力楠林地. 火力楠林地有机质含量、全N和碱解N含量>荷木林地, 荷木林地的全P、全K、速效P含量>火力楠林地. 细菌占微生物总量的94%以上, 黎蒴林地的细菌数量高达41×10⁵个·g⁻¹干土, 而火力楠林地和荷木林地分别为3.4×10⁴个·g⁻¹干土和5.3×10⁴个·g⁻¹干土. 黎蒴林地的脲酶、过氧化氢酶、磷酸酶活性最大, 荷木林地纤维素分解酶活性最大. 3种林分中, 黎蒴林的土壤肥力最高.

关键词 [阔叶纯林, 水源涵养, 土壤物理性质, 养分, 微生物, 酶活性](#)

分类号

Soil properties and water holding capacities of *Michelia macclurei*, *Schima superba* and *Castanopsis fissa* stands

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Abstract

The study showed that the soil density, total porosity, natural water capacity and capillary moisture capacity were 1.19 g·cm⁻³, 56.73%, 15.7% and 43.2% in *Michelia macclurei* stand, 1.26 g·cm⁻³, 54.18%, 13.0% and 37.8% in *Schima superba* stand, and 1.06 g·cm⁻³, 60.74%, 19.4%, and 45.8% in *Castanopsis fissa* stand, respectively. Soil water holding capacity and aeration were good in *Castanopsis fissa* stand but bad in *Schima superba* stand, whereas *Michelia macclurei* stand had a medium water holding capacity and a bad aeration. The water holding capacity of litter per tree was in order of *Michelia macclurei* (20 kg) > *Castanopsis fissa* (15 kg) > *Schima superba* (8 kg), whereas that of litter in stand was *Castanopsis fissa* (17 t·hm⁻²) > *Michelia macclurei* (16 t·hm⁻²) > *Schima superba* (13 t·hm⁻²). The nutrient storage of litter per tree was 112.71, 31.20 and 87.30 g in *Michelia macclurei*, *Schima superba* and *Castanopsis fissa* stands, respectively, and that of litter in stand was 84.35, 51.86 and 98.11 kg·hm⁻², respectively. The soil in the three stands was strong acidic, and the content of soil organic matter, total N, total P, total K, alkalized N, available P and available K

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was 18.43 g·kg⁻¹,0.69 g·kg⁻¹,0.17 g·kg⁻¹,5.83 g·kg⁻¹,45.67 mg·kg⁻¹,0.83 mg·kg⁻¹ and 23.13 mg·kg⁻¹ in *Michelia macclurei* stand,13.40 g·kg⁻¹,0.68 g·kg⁻¹,0.20 g·kg⁻¹,12.32 g·kg⁻¹,40.78 mg·kg⁻¹,0.85 mg·kg⁻¹ and 90.63 mg·kg⁻¹ in *Schima superba* stand,and 28.50 g·kg⁻¹,0.97 g·kg⁻¹,0.23 g·kg⁻¹,18.77 g·kg⁻¹,73.40 mg·kg⁻¹,1.45 mg·kg⁻¹ and 66.50 mg·kg⁻¹ in *Castanopsis fissa* stand, respectively.Soil bacteria accounted for >94% of soil microbes,and their individuals were 41·10⁵,34·10⁴ and 5.3·10⁴ g⁻¹ in *Michelia macclurei*, *Schima superba* and *Castanopsis fissa* stands,respectively.The activities of soil urease,catalase and phosphatase in *Castanopsis fissa* stand were the greatest among the three stands,while soil cellulase activity in *Michelia macclurei* stand was greater than that in other two stands.In a word,soil fertility of *Castanopsis fissa* stand was the highest among three test stands.

Key words

[Pure broad-leaved stand](#) [Water conservation](#) [Soil physical property](#) [Nutrient](#)
[Microorganism](#) [Enzyme activity](#)

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