

间作对低效油茶林土壤特性和水土流失的影响

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摘要:【目的】探究不同间作模式对幼龄油茶林地土壤理化及生物环境的影响及其水土保持效益, 为油茶林下套种作物的生态环境选择和构建、防治油茶林地水土流失等方面提供理论基础和实践依据。【方法】选取 8 年生(3 年生苗)油茶低效林, 设置 4 个处理: 油茶单作(CK)、油茶+爬山虎(CO-PT)、油茶+金鸡菊(CO-CL)和油茶+薄荷(CO-MH), 每个处理样地面积 600m², 3 个重复。在样地中设置水平投影为 16m×7m 的径流小区, 共设置 12 个径流小区。测定不同间作模式油茶产量、土壤理化性质及 5 次场降雨的地表径流量、土壤侵蚀量及氮磷养分流失量, 通过皮尔逊相关性分析以解析间作对油茶生长的影响及驱动机制。【结果】CO-PT 模式显著提高了油茶果产量及茶油产量, CO-MH 模式显著提高了油茶的果实含油率。各间作处理均提高了油茶林土壤 pH 值和土壤容重, CO-MH 处理显著提高了油茶林土壤有机碳含量和土壤脲酶活性。各间作模式均显著减少了油茶林地表径流、土壤侵蚀和土壤氮、磷流失量, 且 CO-CL 和 CO-MH 水土保持效益最佳。相关性分析表明: 油茶果产量与茶油呈显著正相关, 且 pH 与有机碳和多酚氧化酶呈显著正相关。油茶林地表径流与土壤侵蚀和土壤氮、磷流失量呈显著正相关, 而油茶含油率与地表径流和土壤侵蚀、氮流失量呈显著负相关。【结论】油茶间作处理(尤其是油茶+金鸡菊和油茶+薄荷)有利于缓解土壤酸化, 改善土壤特性, 减少水土流失。这是维持低效油茶林生态系统健康和其可持续管理的有效措施。

关键词: 油茶; 间作; 土壤理化性质; 土壤侵蚀

Intercropping changed the soil characteristics of low-efficiency *Camellia oleifera* forest, reduced soil erosion

Abstract: 【Objective】To explore the effects of different intercropping patterns on soil physical and chemical and biological environment of young *Camellia oleifera* forest and its soil and water conservation benefits, and to provide theoretical basis and practical basis for the selection and construction of ecological environment of intercropping crops under *Camellia oleifera* forest and the prevention and control of soil and water loss in *Camellia oleifera* forest. 【Method】We selected an eight-year-old (three-year-old seedling) low-efficiency *Camellia oleifera* forest and set up four treatments: *Camellia oleifera* monoculture (CK), *Camellia oleifera* + *Parthenocissus tricuspidata* (CO-PT), *Camellia oleifera* + *Coreopsis lanceolata* (CO-CL) and *Camellia oleifera* + *Mentha haplocalyx* (CO-MH). The area of each treatment plot was 600 m², with three replicates. A runoff plot with a horizontal projection of 16m × 7m was set up in the plot, and a total of 12 runoff plots were set up. The yield, soil physical and chemical properties and surface runoff, soil erosion and nitrogen and phosphorus nutrient loss of 5 rainfalls in

different intercropping patterns of *Camellia oleifera* were measured. Pearson correlation analysis was used to analyze the effect of intercropping on the growth of *Camellia oleifera* and its driving mechanism. **【Results】** The CO-PT treatment significantly increased total fruit yield and oil yield of *Camellia oleifera*, and the CO-MH treatment significantly increased the oil content of *Camellia oleifera*. Each intercropping treatment increased the soil pH value and soil bulk density of the *Camellia oleifera* forest. The CO-MH treatment significantly increased the soil organic carbon content and soil urease activity of *Camellia oleifera*. Each intercropping treatment significantly reduced surface runoff, soil erosion, and soil nitrogen and phosphorus loss of *Camellia oleifera*, and CO-CL and CO-MH had the best soil and water conservation benefits. Correlation analysis showed that total fruit yield was significantly positively correlated with oil yield of *Camellia oleifera*, and pH was significantly positively correlated with soil organic carbon and polyphenol oxidase. The runoff was significantly positively correlated with soil erosion, soil nitrogen and phosphorus loss, while the oil content of *Camellia oleifera* was significantly negatively correlated with surface runoff, soil erosion, and nitrogen loss. **【Conclusion】** *Camellia oleifera* intercropping treatments (especially CO-CL and CO-MH) are beneficial to alleviating soil acidification, improving soil properties, and reducing soil erosion. This is an effective measure to maintain the health of the inefficient *Camellia oleifera* forest ecosystem and its sustainable management.

Key words: *Camellia oleifera*; intercropping; soil physicochemical properties; soil erosion