

火干扰和黑碳添加对兴安落叶松林凋落物分解的影响

于澄, 史哲, 胡同欣

(东北林业大学林学院, 森林生态系统可持续经营教育部重点实验室, 哈尔滨 150040)

摘要: 【目的】分解和火干扰是森林凋落物养分循环的重要生态过程, 缓慢的分解速率会促使凋落物的累积, 从而导致林火发生的概率大幅提升。同时火后产生的副产物黑碳, 其在凋落物分解过程中发挥的作用还尚不可知。【方法】因此为了更好的探究火和黑碳对凋落物分解的影响, 本文通过在我国内蒙古大兴安岭地区的兴安落叶松林 (*Larix gmelinii*) 针叶凋落物为研究对象, 探究火干扰、黑碳添加以及火干扰和黑碳添加共同作用下对凋落物分解的影响机制, 及影响分解的主要因子。【结果】火干扰对凋落物分解有促进作用, 低强度火干扰影响下调落物分解更快。黑碳添对凋落物分解有促进作用, 黑碳梯度越大凋落物分解越快。火干扰和黑碳添共同影响下调落物分解有促进作用, 在低强度火干扰后高梯度黑碳添加影响下分解更快。【结论】火干扰、黑碳添加、火干扰和黑碳添加共同影响下, 通过改变土壤因子、凋落物自身化学组成、酶活性等直接和间接影响凋落物分解, 间接影响的作用要强于直接影响, 且在火干扰和黑碳共同影响下, 黑碳添加的作用更强。因此火干扰和火干扰后产生的副产物黑碳在凋落物分解过程中发挥的作用值得被关注。

Effects of fire disturbance and black carbon addition on litter decomposition of *Larix gmelinii*

Cheng Yu Zhe Shi Tong-Xin Hu

(Key Laboratory of Sustainable Forest Ecosystem Management-Ministry of Education, College of Forestry, Northeast Forestry University, Harbin 150040, China)

Abstract: 【Objective】 Decomposition and fire disturbance are important ecological processes in nutrient cycling of forest litter, and slow decomposition rates can promote the accumulation of litter, leading to a significant increase in the probability of forest fire occurrence. The role of black carbon, a byproduct produced after the fire, in the decomposition process of litter is still unknown. 【Method】 Therefore, in order to better explore the impact of fire and black carbon on litter decomposition, this article takes the needle leaf litter of *Larix gmelinii* in the Greater Xing'an Mountains region of Inner Mongolia, China as the research object, and explores the impact mechanism of fire disturbance, black carbon addition, and the combined effect of fire disturbance and black carbon addition on litter decomposition, as well as the main factors affecting decomposition. 【Result】 Fire interference has a promoting effect on the decomposition of litter, and under the influence of low intensity fire disturbance, litter decomposition is faster. Black carbon addition has a promoting effect on the decomposition of litter, and the larger the black carbon gradient, the faster the decomposition of litter. The combined effects of fire disturbance and black

carbon addition have a promoting effect on the decomposition of litter, and the decomposition is faster under the influence of high gradient black carbon addition after low intensity fire disturbance. **【Conclusion】** In summary, under the joint influence of fire disturbance, black carbon addition, fire disturbance, and black carbon addition, the decomposition of litter is directly and indirectly affected by changes in soil factors, litter chemical composition, enzyme activity, etc. The indirect effect is stronger than the direct effect, and under the joint influence of fire disturbance and black carbon, the effect of black carbon addition is stronger. Therefore, the role of black carbon, a byproduct produced by fire disturbance and fire disturbance, in the decomposition process of litter deserves attention.