

## 巨桉凋落叶分解初期对菊苣生长和光合特性的影响

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Effects of *Eucalyptus grandis* leaf litter at its early stage of decomposition on the growth and photosynthetic characteristics of *Cichorium intybus*.WU Xiu-hua<sup>1</sup>, LI Yi-qiao<sup>1</sup>, HU Ting-xing<sup>1</sup>, CHEN Bao-jun<sup>2</sup>, YANG Yong-gui<sup>2</sup>, CHEN Hong<sup>1</sup>, HU Hong-ling<sup>1</sup>

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摘要

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摘要

采用盆栽试验,于2010年3—5月在四川农业大学教学科研园区内研究了巨桉凋落叶分解初期对受体植物菊苣幼苗生长和光合特性的影响。试验设置CK(0 g·pot<sup>-1</sup>)、A<sub>1</sub>(30 g·pot<sup>-1</sup>)、A<sub>2</sub>(60 g·pot<sup>-1</sup>)和A<sub>3</sub>(90 g·pot<sup>-1</sup>)4个凋落叶施用水平,将各处理的凋落叶分别与12 kg土壤混合后装盆,播种菊苣,分别在播种30、45、60和75 d测定菊苣生长指标,待凋落叶量的最高处理组A<sub>3</sub>植株第3片真叶完全展开后,测定菊苣叶片的光合生理指标。结果表明:在各测定时间下,不同巨桉凋落叶施用水平的菊苣生物量积累和叶面积增长受到显著抑制;在凋落叶分解初期,菊苣幼苗叶片光合色素合成受到明显抑制,且随着凋落叶施用量增加抑制作用加大,各处理幼苗的光合速率日变化均呈午休双峰型曲线,气孔导度和水分利用效率的变化趋势与净光合速率相同,日光合总量表现为CK>A<sub>1</sub>>A<sub>2</sub>>A<sub>3</sub>。经GC-MS定期检测,凋落叶中有33种小分子化合物随着凋落叶的分解而逐步释放,以具有化感作用的萜类物质为主。

关键词: 巨桉 凋落叶 菊苣 化感物质 光合作用

Abstract:

From March to May, 2010, a pot experiment was conducted to investigate the effects of *Eucalyptus grandis* leaf litter at its early stage of decomposition on the growth and photosynthetic characteristics of *Cichorium intybus*. Four treatments with different application rate of the leaf litter, i.e., 0 g·pot<sup>-1</sup> (CK), 30 g·pot<sup>-1</sup> (A<sub>1</sub>), 60 g·pot<sup>-1</sup> (A<sub>2</sub>), and 90 g·pot<sup>-1</sup> (A<sub>3</sub>), were installed. Each pot contained 12 kg soil mixed with the leaf litter, and then, *C. intybus* was sown. The growth indicators of the *C. intybus* were measured at the 30, 45, 60, and 75 d after sowing, and the photosynthetic characteristics of the *C. intybus* in treatment A<sub>3</sub> were studied after the seedlings third leaf fully expanded. At each measured time, the biomass accumulation and leaf area growth of *C. intybus* in treatments A<sub>1</sub>, A<sub>2</sub>, and A<sub>3</sub> were inhibited significantly. At the early stage of the leaf litter decomposition, the synthesis of photosynthetic pigments of the *C. intybus* seedlings was inhibited significantly, and the inhibition effect was getting stronger with the increasing amount of the leaf litter addition. The diurnal change of the seedlings photosynthetic rate in all treatments showed a bimodal curve with midday depression, the stomatal conductance and water use efficiency had the same variation trend with the net photosynthetic rate, and the total diurnal photosynthesis decreased in the order of CK > A<sub>1</sub> > A<sub>2</sub> > A<sub>3</sub>. The GC-MS analysis showed there were 33 kinds of small molecule compounds released gradually with the decomposition of the leaf litter, among which, allelopathic substance terpenoid dominated.

Key words: *Eucalyptus grandis* leaf litter *Cichorium intybus* allelopathic substance photosynthesis.

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