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## 烟田生态系统碳收支研究

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**摘要:** 农业生态系统碳平衡对评估陆地生态系统的源和汇具有重要意义, 针对烤烟生长及管理的特殊性, 研究烟田生态系统碳收支, 为提升烟田管理及农业碳汇估算提供依据。本研究以定位试验为平台, 以单施化肥处理为研究对象, 于2015—2017年观测了烤烟生长季的碳收支。研究表明, 烤烟生物量平均为(5832.10±537.32) kg hm<sup>-2</sup>; 烟株碳含量平均为(42.14±0.05)%, 累积固碳量为(2459.25±233.78) kg hm<sup>-2</sup>。烤烟根系碳占烟株碳比例较高, 平均为24.94%。烤烟生长季湿沉降碳达到了115.32 kg hm<sup>-2</sup>, 干沉降碳量为6.54 kg hm<sup>-2</sup>, 两者占根系碳的20.01%。烟生长季碳输出总量为2464.98 kg hm<sup>-2</sup>, 其中CO<sub>2</sub>排放碳占碳支出的98.99%, 径流损失碳占支出的0.76%, 淋溶损失碳占支出的0.25%。烟田生态系统对大气而言是弱碳汇, 碳汇量116.13 kg hm<sup>-2</sup>。虽然烤烟固碳总量相对较低, 但其根系对土壤碳贡献却相对较高。

**关键词:** 烤烟; 碳收支; 碳汇/源; 碳排放; 大气沉降

## The study of carbon budget on field-tobacco ecosystem

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**Abstract:** The carbon balance of the agricultural ecosystem is of great significance for the assessment of the source and sink of the terrestrial ecosystem. In view of the particularity of the growth and management of flue-cured tobacco, the carbon budget of the field-tobacco ecosystem was studied in order to provide the basis for the improvement of tobacco field management and the estimation of agricultural carbon sink. In this study, the carbon budget was observed with single application of chemical fertilizer using the long-term positioning test station for three years from 2015 to 2017. The results showed that the average cumulative biomass of flue-cured tobacco, the average carbon content of tobacco plant, and the cumulative carbon sequestration were (5832.10 ± 537.32) kg hm<sup>-2</sup>, (42.14 ± 0.05)%, and (2459.25 ± 233.78) kg hm<sup>-2</sup>, respectively. The ratio of root carbon to plant carbon was higher, with an average of 24.94%. The wet deposition carbon and the dry deposition carbon were 115.32 kg hm<sup>-2</sup> and 6.54 kg hm<sup>-2</sup> respectively, both accounting for 20.01% of root carbon amount. The total carbon output in growing season was 2464.98 kg hm<sup>-2</sup>, in which the CO<sub>2</sub> emission expenditure accounts for 98.99%, the runoff carbon expenditure 0.76%, and the leaching carbon accounts for 0.25%. The flue-cured tobacco ecosystem was a weak carbon sink to the atmosphere, with a carbon sink of 116.13 kg hm<sup>-2</sup>. The total amount of carbon sequestration in flue-cured tobacco was relatively lower, whereas its root system had a relatively higher contribution to soil carbon.

**Keywords:** flue-cured tobacco; carbon budget; carbon sink/source; carbon emission; atmospheric deposition

农田生态系统是巨大的碳库, 是陆地生态系统 碳循环的重要组成部分, 农业生态系统碳平衡对于

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