

研究论文

FACE对武香粳14根系生长动态的影响

杨洪建, 杨连新, 刘红江, 黄建晔, 董桂春, 朱建国, 王余龙

扬州大学江苏省作物栽培生理重点实验室, 江苏扬州225009

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摘要 2002—2003年利用我国惟一的农田开放式空气CO₂浓度增高(FACE)研究平台, 研究大气CO₂浓度比对照高200 μmol · mol⁻¹的FACE处理对早熟晚粳稻品种武香粳14根系生长动态的影响。结果表明, (1)FACE处理水稻分蘖期、拔节期、抽穗期每穴的不定根数、不定根总长度、根系体积以及根干重均极显著大于对照; (2)FACE处理使水稻有效分蘖期间和无效分蘖期间发生的不定根粗度均显著大于对照, 使拔节长穗期间发生的不定根粗度明显变细, 因而使抽穗期每条不定根的平均粗度与对照无显著差异; (3)FACE处理水稻抽穗期每穴的不定根数、不定根总长度、根系体积和根干重均极显著大于对照主要是由于FACE处理使水稻有效分蘖期间和无效分蘖期间这些根系性状的大幅度增加, 而FACE处理对水稻拔节长穗期间这些根系性状的影响较小。

关键词 [水稻](#) [FACE](#) [根系](#) [根系生长动态](#)

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Effect of Free-air CO₂ Enrichment on Root Growth Dynamics of Japonica Rice (*Oryza sativa* L.) Cultivar Wuxiangjing 14

YANG Hong-Jian, YANG Lian-Xin, LIU Hong-Jiang, HUANG Jian-Ye, DONG Gui-Chun, ZHU Jian-Guo, WANG Yu-Long

Key Laboratory of Crop Cultivation & Physiology, Jiangsu Province, Yangzhou University, Yangzhou 225009, Jiangsu

Abstract Increasing atmospheric CO₂ concentrations are generally expected to enhance photosynthesis and growth and as a result substantially increase yields in C₃ cereal crops. However, little is known about the effect of elevated CO₂ on root growth of rice. To better understand the response of rice root system to elevated CO₂ concentration, a free-air CO₂ enrichment [FACE, 200 μmol · mol⁻¹ higher than Ambient(AMB)] experiment was conducted at Anzhen town, Jiangsu, China, to study the root growth dynamics of rice, with Japonica cultivar Wuxiangjing 14, in 2002—2003. The results showed that: (1)The number of adventitious roots per hole, the length of adventitious roots per hole, the roots volume per hole and the dry weight of roots per hole under FACE condition were significantly higher than those under AMB at tillering, jointing and heading stages; (2)The average diameter per adventitious root generated during effective-tillering and unproductive-tillering period were significantly increased, while that generated during stem elongating and panicle bearing period became more and more thinner under FACE condition, which resulted in no significant differences of adventitious root diameter between FACE and AMB at heading stage; (3)The number of adventitious roots per hole, the length of adventitious roots per hole, the roots volume per hole and the dry weight of roots per hole under FACE were significantly higher than those under AMB at heading stage, which was chiefly resulted from the larger increment of those root traits stimulated by FACE during effective-tillering and unproductive-tillering period. While no obvious stimulation due to FACE were detectable for those root traits during stem elongating and panicle bearing period.

Key words [Rice](#); [Free-air CO₂ enrichment](#); [Root system](#) [Root growth dynamics](#)

DOI:

通讯作者 王余龙 ylwang@yzu.edu.cn

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