

研究论文

# FACE对武香粳14根系活性影响的研究

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** 利用我国惟一的农田开放式空气CO<sub>2</sub>浓度增高(Free-air CO<sub>2</sub> enrichment-FACE)研究平台, 研究大气CO<sub>2</sub>浓度比对照(现大气CO<sub>2</sub>浓度)高200 μmol · mol<sup>-1</sup>的FACE处理对水稻品种武香粳14根系活性的影响。结果表明: (1)FACE处理使水稻单位干重根系的总吸收面积、活跃吸收面积的最大值比对照提早10 d左右, 移栽后18 d及其以后不同生育时期的单位干重根系的总吸收面积、活跃吸收面积、α-萘胺氧化量等根系活性指标均显著或极显著低于对照, 但FACE处理对每穴根系活性的影响相对较小; (2)移栽后28 d及其以后不同生育时期每穴的不定根数、不定根总长度、根系体积、根干重与单位干重根系的活性关系密切, 根量越大单位干重根系的活性越低; (3)不同生育时期的植株含氮率与单位干重根系的活性多呈正相关, 植株碳氮比与单位干重根系的活性多呈负相关。笔者认为, FACE处理水稻生育前期根系生长量大、植株含氮率低、碳氮比高等可能是造成其单位干重根系活性显著低于对照的重要原因。

**关键词** [水稻](#) [FACE](#) [根系活性](#) [含氮率](#) [碳氮比](#)

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## Effect of Free-air CO<sub>2</sub> Enrichment on Root Activity of Japonica Rice (*Oryza sativa* L.) Cultivar Wuxiangjing 14

YANG Hong-Jian, YANG Lian-Xin, LIU Hong-Jiang<sup>1</sup>, HUANG Jian-Ye<sup>1</sup>, DONG Gui-Chun, ZHU Jian-Guo, WANG Yu-Long

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

**Abstract** A free-air CO<sub>2</sub> enrichment experiment was conducted at Anzhen city, Wuxi, Jiangsu, China, to study the effect of free-air CO<sub>2</sub> enrichment [FACE, 200 μmol · mol<sup>-1</sup> higher than Ambient(AMB)] on root growth dynamics, using the Japonica cultivar Wuxiangjing 14. Results showed that: (1) The peak value of total absorption area per unit dry weight of root and active absorption area per unit dry weight of root under FACE reached 10 days earlier than those at ambient air; and FACE treatment significantly decreased the total absorption area per unit dry weight of root, active absorption area per unit dry weight of root and the amount of α-NA per unit dry weight of root at 18 days after transplanting and its followed different stages, while little effects of FACE were detected on root activity per hole.(2)Root activity per unit dry weight of root negatively correlated with the number of adventitious roots per hole, total length of adventitious roots per hole, roots volume and dry weight of root per hole at 28 days after transplanting and its followed different stages. The larger the root production, the lower the root activity per unit dry weight. (3) For the most part, root activity per unit dry weight of root positively correlated with N content of rice plant, and negatively correlated with C/N ratio. According to available study results, the authors speculated that the largeness of biomass accumulated at early growth stages, lower N content in rice plant and higher C/N ratio appear to be the primary causes of significant decrement of root activity per unit dry weight of root under FACE condition.

**Key words** [Rice](#); [Free-air CO<sub>2</sub> Enrichment](#); [Root activity](#); [N content](#); [C/N ratio](#)

DOI:

通讯作者 王余龙 [ylwang@yzu.edu.cn](mailto:ylwang@yzu.edu.cn)

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