

高温胁迫下水稻叶片的蛋白响应及其基因型和生育期差异

周伟辉¹, 薛大伟², 张国平^{1,*}

1 浙江大学农业与生物技术学院, 浙江杭州 310029; 2 杭州师范大学生命与环境科学学院, 浙江杭州 310036

Protein Response of Rice Leaves to High Temperature Stress and Its Difference of Genotypes at Different Growth Stage

ZHOU Wei-Hui¹, XUE Da-Wei², ZHANG Guo-Ping^{1,*}

1 Department of Agronomy, College of Agriculture and Biotechnology, Huajiachi Campus, Zhejiang University, Hangzhou 310029, China; 2 College of Life and Environment Sciences, Hangzhou Normal University, Hangzhou 310036, China

摘要

参考文献

相关文章

Download: [PDF \(1912KB\)](#) [HTML 1KB](#) Export: [BibTeX](#) or [EndNote \(RIS\)](#) [Supporting Info](#)

摘要 高温已经成为水稻产量的主要限制因素, 且其影响由于全球温室效应的加剧而呈扩大趋势。本研究在鉴定耐热水稻基因型的基础上, 从生理学和蛋白质组学上进行耐性机理研究。结果表明, 苗期或抽穗期高温处理导致结实率、SPAD值、株高、根长和生物量下降, 丙二醛、过氧化氢、超氧阴离子含量增加和超氧化物歧化酶活性提高。同时, 高温胁迫对热敏感品种明恢63的影响大于对耐热品种密阳46的影响。蛋白质组学分析表明, 高温使光合作用相关蛋白、能量类蛋白、代谢类蛋白表达量下降, 抗逆相关蛋白表达量上升。另外, 蛋白试验结果佐证了密阳46的耐热性以及水稻抽穗期对高温的敏感性。本研究还首次发现抗逆相关蛋白2-cys过氧化物酶BAS1的表达量在高温下上升。

关键词: 水稻 高温 耐热性 基因型 蛋白质组学

Abstract: High temperature has become a major disastrous factor affecting rice productivity, and the temperature stress becomes more severe due to the global warming effect. The present study was carried out to identify the rice genotypes with high heat tolerance and understand the tolerant mechanisms of both physiology and proteomics. The results showed that seed setting rate, SPAD value, plant height, root length and biomass were dramatically reduced under high temperature, while contents of malondialdehyde, hydrogen peroxide and superoxide anions, and activity of superoxide dismutase were greatly increased, irrespectively of growth stage. Moreover, Minghui 63 (a heat-sensitive genotype) was much more affected by heat stress than Milyang 46 (a heat-tolerant genotype). Proteomic analysis showed that high temperature resulted in down-regulation of the proteins related to photosynthesis, energy and metabolism, while resistance-related proteins were up-regulated. The results also confirmed the heat tolerance of Milyang 46 and the heat sensitivity of the rice plants at heading stage. The up-regulation of anti-stress protein, 2-cys peroxiredoxin BAS1, under heat stress was first reported in this study.

Keywords: Rice High temperature Thermo-tolerance Genotype Proteomics

Received 2010-10-22; published 2011-03-24

Fund:

本研究由浙江省科学技术厅项目(2008C22069)资助。

Corresponding Authors: 张国平, E-mail: zhanggp@zju.edu.cn

引用本文:

周伟辉, 薛大伟, 张国平. 高温胁迫下水稻叶片的蛋白响应及其基因型和生育期差异[J] 作物学报, 2011, V37(05): 820-831

ZHOU Wei-Hui, XUE Da-Wei, ZHANG Guo-Ping. Protein Response of Rice Leaves to High Temperature Stress and Its Difference of Genotypes at Different Growth Stage[J] Acta Agron Sin, 2011, V37(05): 820-831

链接本文:

<http://211.155.251.148:8080/zwx/CN/10.3724/SP.J.1006.2011.00820> 或 <http://211.155.251.148:8080/zwx/CN/Y2011/V37/I05/820>

Service

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [Email Alert](#)
- ▶ [RSS](#)

作者相关文章

- ▶ [周伟辉](#)
- ▶ [薛大伟](#)
- ▶ [张国平](#)