

研究报告

茄子光系统 II 的热胁迫特性

王梅¹, 高志奎¹, 黄瑞虹¹, 王惠英¹, 张文丽¹, 高荣孚²

¹河北农业大学园艺学院, 河北保定 071001;

²北京林业大学生物科学与技术学院, 北京 100083

收稿日期 2005-12-30 修回日期 2006-11-3 网络版发布日期 接受日期

摘要 以耐热性较弱的黑贝一号圆茄和耐热性较强的黑贝二号圆茄为试材, 热胁迫处理后采用植物效率仪PEA进行快速叶绿素荧光诱导曲线及其参数测定. 结果表明: 当温度高于40 ℃, PS II 结构受热胁迫影响较为敏感, 表现为初始荧光 F_o 缓慢上升; PS II 原初光化学效率 F_v/F_m 和 $\Delta F/F_m'$ 大幅度下降, 且黑贝二号 F_v/F_m 的半衰时间 T_{50} 和 $\Delta F/F_m'$ 的半衰温度 t_{50} 分别大于黑贝一号. 较高的热胁迫剂量(48℃处理5 min或44℃处理20~30min)下, 快速荧光诱导动力学曲线呈现OKJIP型, 在700 μ s处出现与放氧复合体失活有关的K相. 黑贝一号在44 ℃下处理20 min才有K相出现, 黑贝二号则晚10 min出现. 与35℃相比, 在48℃, 特别是在52℃的较高剂量热胁迫下, Strasser能量流动模型参数中的 DI_o/RC 有大幅度地增加, 体现了热耗散对PS II 的较强保护能力. 随着热胁迫温度的升高和热胁迫时间的延长, 两品种的无活性中心 F_{vi}/F_v 显著增加.

关键词 [热胁迫](#) [叶绿素荧光参数](#) [光系统 II](#) [茄子](#)

分类号

Heat stress characteristics of photosystem II in eggplant

WANG Mei¹, GAO Zhi-kui¹, HUANG Rui-hong¹, WANG Hui-ying¹, ZHANG Wen-li¹, GAO Rong-fu²

¹College of Horticulture, Hebei Agricultural University, Baoding 071001, Hebei, China;

²College of Biological Sciences and Technology, Beijing Forestry University, Beijing 100083, China

Abstract

With lower-and higher heat-resistant varieties of eggplant (*Solanum melongena* L.) Hebei I and Hebei II as test materials, and by using Plant Efficiency Analyzer (PEA) from Hansatech, this paper measured the fast chlorophyll a fluorescence transient and its parameters. The results showed that PS II construction became more sensitive to heat stress when ambient temperature was higher than 40 ℃. The F_o went up slowly, and F_v/F_m and $\Delta F/F_m'$ came down dramatically. Hebei II had a longer semi-attenuation temperature of F_v/F_m (T_{50}) and $\Delta F/F_m'$ (t_{50}) than Hebei I. Under strong heat stress (5 min at 48 ℃ or 20-30 min at 44 ℃), the K-step in relation to the inactivation of oxygen-evolving complex appeared in fluorescence rise at about 700 μ s, and the regular O-J-I-P transient was transformed to O-K-J-I-P one. The K-phase of Hebei I and Hebei II appeared when the treatment time was up to 20 and 30 minutes at 44 ℃, respectively. In comparing with 35 ℃ heat treatment, the DI_o/RC in the parameters of Strasser's specific energy fluxes model was increased by a great extent under 48 ℃ or more heat stress, reflecting a strong safeguard of energy dissipation to PS II. When the temperature of heat stress increased from 35 ℃ to 52 ℃, the F_{vi}/F_v of PS II silent reaction centers of Hebei I and Hebei II increased remarkably.

Key words [heat stress](#) [chlorophyll fluorescence parameter](#) [photosystem II](#) [eggplant \(*Solanum melongena* L.\)](#)

DOI:

通讯作者

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(0KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

相关信息

- ▶ [本刊中 包含“热胁迫”的相关文章](#)
- ▶ [本文作者相关文章](#)

- [王梅](#)
- [高志奎](#)
- [黄瑞虹](#)
- [王惠英](#)
- [张文丽](#)
- [高荣孚](#)