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观赏植物

牡丹柱枝孢叶斑病（*Cylindrocladium canadense*）对叶片光合系统功能的影响

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Effect of Infection by *Cylindrocladium canadense* on Behaviors of Photosystems in Tree Peony Leaves

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- 摘要
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摘要 以牡丹（*Paeonia suffruticosa*）‘藏枝红’为试验材料，通过测定叶绿素荧光快速诱导动力学曲线、820 nm 光吸收曲线以及气孔交换参数和H_2O_2 含量，研究了柱枝孢叶斑病（*Cylindrocladium canadense*）对牡丹叶片光合性能和光系统功能的影响。结果显示：在病原菌侵染后，牡丹叶片的净光合速率（Pn）、气孔导度和叶绿素含量均下降，而细胞间隙CO_2 浓度升高，表明Pn 的降低是受非气孔因素的影响。*Cylindrocladium canadense* 的侵染，使H_2O_2 含量显著升高，快速叶绿素荧光诱导动力学曲线形状发生明显改变，*F* v/*F* m 和PIABS 均显著下降。PSⅡ供体侧、反应中心和受体侧活性均受到抑制，但PSⅡ受体侧所受抑制比供体侧大。同时，病原菌侵染也使PSⅠ（△I/Io）活性快速下降。由上述研究结果推测：Cylindrocladium canadense 的侵染，使H_2O_2 积累增加，对PSⅠ和PSⅡ的功能造成伤害。PSⅠ活性的下降阻碍了PSⅡ向PSⅠ的电子传递，过剩激发能增加，导致ROS 增加，抑制D1 蛋白的合成，加剧了对PSⅡ伤害，这是其侵染抑制牡丹光合系统的主要原因。

关键词： 牡丹 柱枝孢叶斑病 光系统Ⅰ 光系统Ⅱ 活性氧

Abstract： In the present study，Effect of infection by *Cylindrocladium canadense* on behaviors of photosystemⅠ（PSⅠ）and photosystemⅡ（PSⅡ）in tree peony（Paeonia suffruticosa ‘Zangzhihong’）leaves was estimated by simultaneously measuring their Chlorophyll fluorescence transient，light absorbance at 820 nm，gas exchange and hydrogen peroxide（H_2O_2）content. The data showed that the net photosynthetic rate（*P* n），stomatal conductance and chlorophyll content were significantly decreased compared with that of the control after infection by C. canadense，whereas intercellular CO_2 concentration was significantly increased. These results indicated that the decreased photosynthesis in infected leaves was resulted from non-stomatal factor. Furthermore，significantly enhanced H_2O_2 content，reduced Fv/Fm and PIABS，as well as the changed chlorophyll fluorescence transient was also observed in leaves of tree peony infected by C. canadense. The donor sides（Oxygen evolution complex），reaction centers and acceptor sides of PSⅡ were significantly inhibited by C. canadense infection. But the acceptor sides were more suffered than the donor sides. At the same time，the activity of PSⅠ was also significantly reduced. Taken together，the data presented here indicated that C. canadense infection resulted in the accumulation of H_2O_2，which in turn damaged the functions of PSⅠand PSⅡ. The decline of PSⅠ activity inhibited transportation of electrons from PSⅡ to PSⅠ，which then led to the accumulation of excessive excitation energy and reactive oxygen species（ROS）. The increased ROS Inhibited synthesis of protein D1，accelerating damage to PSⅡ. It was the main reason for inhibition of photosystems in tree peony leaves after infected by C. canadense.

Keywords： tree peony， Cylindrocladium canadense， PSⅠ， PSⅡ， reactive oxygen species

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没有本文参考文献

[1] 杨青珍, 饶景萍, 王玉萍.‘徐香’猕猴桃采收后逐步降温处理对果实冷害、品质和活性氧代谢的影响[J]. 园艺学报, 2013,40(4): 651-

[2] 李 亮, 董春娟, 尚庆茂.内源水杨酸参与黄瓜叶片光合系统对低温胁迫的响应[J]. 园艺学报, 2013,40(3): 487-497

[3] 侯小改, 郭大龙, 黄燕梅, 张曦.牡丹*Ty3-gypsy* 类反转录转座子反转录酶序列的克隆及分析[J]. 园艺学报, 2013,40(1): 98-106

[4] 张 倩, 王华芳.牡丹试管苗生根与移栽技术研究进展[J]. 园艺学报, 2012,39(9): 1819-1828

[5] 金鹏, 吕慕雯, 孙萃萃, 郑永华, 孙明.MeJA与低温预贮对枇杷冷害和活性氧代谢的影响[J]. 园艺学报, 2012,39(3): 461-468

[6] 孙勃, 汪炳良, 闫会转, 沈望舒, 张芬, 刘娜, 汪俏梅.芥蓝感染核盘菌过程中活性氧和芥子油苷的变化[J]. 园艺学报, 2012,39(2): 289-296

[7] 宋会兴, 刘光立, 高素萍, 陈其兵.四川牡丹种子浸提液内源抑制物活性初探[J]. 园艺学报, 2012,39(2): 370-374

[8] 陈新斌, 孙锦, 郭世荣, 陆晓民, 何立中, 严蓓.二硫苏糖醇对海水胁迫下菠菜活性氧代谢及叶绿素荧光特性的影响[J]. 园艺学报, 2012,39(12): 2457-2467

[9] 石颜通, 周波, 张秀新, 江海东, 薛璟祺, 王顺利.牡丹89 个不同种源品种遗传多样性和亲缘关系分析[J]. 园艺学报, 2012,39(12): 2499-2506

[10] 王晓庆, 张超, 王彦杰, 董丽.牡丹NCED 基因的克隆和表达分析[J]. 园艺学报, 2012,39(10): 2033-2044

[11] 罗 娅;汤浩茹.‘丰香’草莓果实发育过程中抗氧化物质与活性氧代谢研究[J]. 园艺学报, 2011,38(8): 1523-1530

[12] 贺 丹;王 政;何松林;.牡丹试管苗生根过程解剖结构观察及相关激素与酶变化的研究 [J]. 园艺学报, 2011,38(4): 770-776

[13] 袁 媛;余忆冬;连芳青;唐东芹;.小苍兰切花瓶插生理研究 [J]. 园艺学报, 2011,38(3): 579-586

[14] 黄雪梅;张 灿;庞学群;张昭其;.INA诱导的香蕉果实抗病性与早期活性氧积累的关系[J]. 园艺学报, 2011,38(2): 265-265‐272

[15] 史国安;郭香凤;孔祥生;张国海;包满珠;.牡丹呼吸速率和内源激素含量变化与开花衰老的关系[J]. 园艺学报, 2011,38(2): 303-303‐310