



棉花学报 » 2010, Vol. 22 » Issue (6) :568-573 文章编号: 1002-7807 (2010) 06-0568-06

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荒漠绿洲区棉花幼苗耐寒生理特性及其评价指标分析

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Analysis of Physiological Characteristics and Evaluation Indexes of Cold-tolerance in Cotton Seedlings of Desert-Oasis Region

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摘要

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摘要 通过测定不同耐寒性的棉花幼苗在4℃冷胁迫下的超氧化物歧化酶(SOD)活性、过氧化氢酶(CAT)活性、过氧化物酶(POD)活性及丙二醛(MDA)、可溶性蛋白(SP)和可溶性糖(SS)含量等,分析相对生理指标随胁迫时间在耐寒基因型间的响应,建立棉花幼苗耐寒性鉴定的简捷、有效的评价生理指标体系。结果表明,相对CAT活性、相对MDA含量、相对SP含量和相对SS含量随冷害时间在不同耐寒基因型棉花幼苗间变化有差异;冷害第3d的相对生理指标与棉苗的冷害指数显著相关,其相对SS含量和相对MDA含量对棉苗的耐寒性强弱有直接影响,而且受其它生理指标的间接影响较小。通过回归分析筛选出了3个与棉花幼苗耐寒性密切相关的生理因子指标:相对MDA含量,相对CAT活性和相对SP含量,建立了耐寒性评价数学模型。

关键词: 棉花 耐寒性 生理 评价指标

Abstract: To set up a simple and efficient screening system for breeding cold-tolerant cotton variety, changes of relative SOD activity, relative CAT activity, relative POD activity, relative MDA content, relative soluble protein content (SP) and relative soluble sugar content(SS) as 4℃ treatment were studied in four cotton variety seedlings with different cold-tolerance, the validity of relative physiological parameters to cold-tolerance were also explored. The results showed that the relative CAT activity, relative MDA, relative SP and relative SS between cold-tolerant cotton seedlings were differently changed as chilling time. The relative physiological parameters chilled in the third day were significantly correlated with chilling index. Relative MDA content and activity relative SS content have a great direct effects on cold-tolerance of cotton seedlings respectively. The relative CAT activity, relative MDA content and relative SP content were screened to have close relation to chilling index by regression analysis, mathematical evaluation model for cold-tolerance of cotton seedlings was set up.

Keywords: cotton cold-tolerance physiological characteristics evaluation index

收稿日期:2010-03-15;

基金资助:

国家自然科学基金(30800695);新疆生产建设兵团育种专项(2006GG04);石河子大学棉花育种攻关专项(gxjs2007-yz11)

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引用本文:

李志博, 曹连莆, 魏亦农, 雷锡琼, 周 川.荒漠绿洲区棉花幼苗耐寒生理特性及其评价指标分析[J]. 棉花学报, 2010,22(6): 568-573.

LI Zhi-Bo, CAO Lian-Pu, WEI Yi-Nong, LEI Xi-Qiong, ZHOU Chuan. Analysis of Physiological Characteristics and Evaluation Indexes of Cold-tolerance in Cotton Seedlings of Desert-Oasis Region[J]. Cotton Science, 2010,22(6): 568-573.

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