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叶绿素荧光动力学O-J-I-P参数在棉花幼苗耐冷性评价上的应用

李志博[1]，华显伟[2]，魏亦农[1]，曹连莆[1*]

1.石河子大学农学院/新疆兵团绿洲生态农业重点实验室，新疆 石河子832003；2.石河子总场四分场场部，新疆 石河子 832044

Cold Tolerance Evaluation of Cotton Seedling Using Some Parameters of Chlorophyll a Fluorescence Kenitics O-J-I-P

LI Zhi-bo[1], HUA Xian-wei[2], WEI Yi-nong[1], CAO Lian-pu[1**]

1.*The Agronomy Department of Shihezi University/Key Laboratory of Oasis Ecology Agriculture of Xinjiang Bingtuan*, *Shihezi*, *Xinjiang* 832003, *China*; 2. *The Forth Proving-ground of Shihezi Center Ground*, *Shihezi*, *Xinjiang* 832004, *China*

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摘要 低温冷害是影响棉花生长的主要逆境因子，如何建立简捷、有效的棉花耐冷性鉴定及筛选体系是棉花耐冷研究的关键问题。在本研究中，阐述了如何用O-J-I-P参数来评价棉花幼苗的耐冷性。选用北疆棉区22个主栽棉花品种，对盆栽幼苗经过连续4 d的4℃低温处理，进行了相应的冷害指数鉴定，并基于O-J-I-P参数Fv/Fm和PI所建立的冷害因子指数1及冷害因子指数2对各个棉花幼苗做了耐冷鉴定和分级评价。结果发现，冷害因子指数1和冷害因子指数2的鉴定、评价结果与冷害指数鉴定结果相近。中棉所36、新陆早25、297-5幼苗具有较强的耐冷性，而新陆早10号、新陆早12号及炮台1号的耐冷性较弱。叶绿素荧光动力学O-J-I-P可以快速、有效地鉴定棉花幼苗的耐冷性，这对棉花的耐冷性鉴定和培育耐冷型的棉花品种具有重要的意义。

关键词： 低温冷害 棉花 叶绿素荧光 耐冷性 冷害因子指数

Abstract： Low temperature and chilling affect cotton developing, to set up a simple and efficient identification and select critiria for cold-tolerance variety is the main breeding aim of cotton. In this paper, the evaluation of the cold-tolerance of cotton seedling by the parameters of chlorophyll a fluoroscence kinetics O-J-I-P was showed. Seedlings of 22 cottons cultivars which fit for planting in Northern Xinjiang area were chilled(4℃) for 4 consecutive days, their chilling index,chilling factor index 1(CFI1) based on O-J-I-P parameter Fv/Fm(the maximum efficiency of photosystem II) and chilling factor index 2(CFI2) based on PI(the performance index) were seperately analyzed. The results showed that the final indentification and evaluation of CFI1, CFI2 and chilling index were almost indentical. The seedlings of CCRI 36, Xinluzao 25 and 297-5 were cold-tolerant, but seedlings of Xinluzao 10, Xinluzao 12 and Paotai 1 were cold sensitive. O-J-I-P test provides a rapid and efficient method on screening cotton seedlings ' cold-tolerance, which is helpful for cotton cold-tolerance breeding.

Keywords： low temperature and chilling cotton chlorophyll a fluorescence cold-tolerance chilling factor index

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Corresponding Authors: caolianpu@126.com

About author: 李志博（1978-），男，在读博士，lzb_oea@shzu.edu.cn

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