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植物遗传学

番茄的CPD带型和45S rDNA 位点的鉴别

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摘要 采用CPD（PI和DAPI组合）染色对番茄减数分裂粗线期和有丝分裂中期染色体进行了显带分析，随后用两种不同的45S rDNA 克隆在相同的分裂相进行了荧光原位杂交定位分析。CPD 染色在8条粗线期染色体上显示出了10条红色的CPD 带纹，在6对有丝分裂中期染色体上显示出了12条CPD带纹。有丝分裂中期染色体上的CPD带纹与粗线期染色体上显要的带纹具有对应性。用改良的CPD染色程序清晰而稳定地显示出的这些特征性的CPD带纹，为番茄的染色体，特别是有丝分裂中期染色体提供了新的识别标记。用番茄的一个45S rDNA 克隆进行的荧光原位杂交，不仅在位于2号染色体短臂的随体上显示了强的杂交信号，而且在粗线期染色体的5个CPD带区或有丝分裂中期染色体的4对CPD带区显示了弱的杂交信号。然而，用来自小麦的45S rDNA 克隆 pTa71进行的原位杂交却只在随体上显示了杂交信号。鉴于所用的两个45S rDNA 克隆在序列上的差异，推断在番茄基因组中只有随体含有45S rDNA单位的编码区，即番茄只有一对45S rDNA位点。

关键词 番茄；染色体显带；CPD（PI和DAPI组合）染色；45S rDNA 荧光原位杂交

分类号

CPD Banding Patterns and Identification of 45S rDNA Sites in Tomato

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Abstract

In this study, we performed sequential combined PI and DAPI (CPD) staining and FISH with two different 45S rDNA clones on meiotic pachytene and mitotic metaphase chromosomes in tomato. 10 red CPD bands were shown on eight pachytene bivalents, and 12 bands were shown on six pairs of mitotic metaphase chromosomes. The CPD bands exhibited on mitotic metaphase chromosomes corresponded to the prominent bands exhibited on the pachytene chromosomes. The distinctive CPD bands, which could be constantly and clearly detected using the CPD staining procedure we improved, provide new landmarks for chromosome identification in tomato. FISH with the tomato 45S rDNA clone revealed very strong signal(s) in the satellite(s) on the short arm of chromosome 2 as well as weak signals in five CPD banded regions at pachytene or four pairs of CPD banded regions at metaphase. However, FISH with pTa71 plasmid only revealed signals in the satellite. Considering the difference in sequence between the two rDNA clones, we infer that only the satellite contain the coding regions of 45S rDNA unit in tomato. The property of CPD bands as well as the DNA sequences probably involved in the five CPD banded regions was discussed.

Key words tomato chromosome banding CPD (combined PI and DAPI) staining 45S rDNA fluorescence in situ hybridization (FISH)

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